Volume 24, Number 1

inpaws journal

Indiana Native Plant and Wildflower Society Spring 2017

Indiana's nature preserve system marks 50th anniversary

By John A. Bacone

The Indiana Legislature passed the Nature Preserves Act in 1967, creating the Division of Nature Preserves. The division is charged with working with partners to set aside and preserve areas of unusual natural significance for present and future generations to benefit from the scientific, aesthetic, cultural and spiritual values they possess.

DNP staff photo

A scene from the Conrad Savanna Nature Preserve in Newton County.

Since the division was established, staff has worked with partners throughout Indiana to catalogue Indiana's flora, fauna and natural areas, striving to set up a system of nature preserves that includes examples of all the natural areas and rare species habitat that occur in Indiana. At least one example of almost every type of the 61 natural communities found in Indiana at the time of settlement is included in Indiana's nature preserve system. Ninety percent of the 416 plants considered endangered, threatened or rare have viable populations in Indiana nature preserves.

Nature preserves are the most widely and evenly distributed system of state-significant public properties in Indiana. As of January, 2017, there were nature preserves in 70 of Indiana's 92 counties. As of January, 2017, there are 274 dedicated nature preserves, protecting 51,836 acres. A dedicated nature preserve has the highest level of protection of any land in Indiana, as it is intended to remain in its natural ecological condition in perpetuity. These nature preserves are owned by 46 different entities, including DNR Divisions of Nature Preserves, Forestry, State Parks, and Fish and Wildlife, land trusts, city and county park departments, and colleges and universities.

The average size of a nature preserve is 189.18 acres. The smallest nature preserves include German Methodist Cemetery Prairie (1.1 acres), Smith Cemetery Prairie (1.1 acres), and Orangeville Rise of Lost River (3.02 acres). The largest nature preserves are Ten O'Clock Line (3,339 acres), Kankakee Sands (1,708 acres), Rocky Hollow-Falls Canyon (1,608 acres),

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Dunes (1,530 acres) and Minton (1,301 acres).

Nature preserves protect portions of some of Indiana's most significant and natural landscapes. Examples include the dunes ecosystem (Dunes Nature Preserve), where examples of beach, foredune, high dunes, prairie, swamp forest, savanna and marsh are found. Nearby are protected examples of interdunal ponds and dune and swale complexes (Gibson Woods and Pine Station Nature Preserves). Sand prairies and sand savanna complexes are protected at Hoosier Prairie, Tefft Savanna, Beaver Lake, Conrad Savanna and Coulter Nature Preserves, and coastal plain ponds are protected at Jasper-Pulaski Fish and Wildlife Area. The Kankakee Sands restoration connects Bill Barnes and Beaver Lake (Willow Slough State Fish and Wildlife Area) to Conrad Savanna and Conrad Station Nature Preserves.

Lee Casebere

Above: a canyon wall at Portland Arch Nature Preserve in Fountain County.

Opposite: part of the Mongoquinong Fen Nature Preserve at Pigeon River Fish and Wildlife Area in LaGrange County.

Glacial features are protected at Moraine Nature Preserve (ponds, fens, seeps, upland forests), and at Glacial Esker (Chain O Lakes State Park). Chains of lakes and wetlands are found in the Trine/Wing Haven/Marsh Lake Complex in Steuben County. Olin Lake Nature Preserve contains Indiana's largest undeveloped lake, and an excellent kettle lake is protected at Spicer Lake Nature Preserve. Fens can be found at Mongoquinong (Pigeon River State Fish and Wildlife Area), Moraine and Prophetstown Fen Nature Preserves, and other nature preserves protect examples of bogs, seeps, floating mats, sedge meadows, marshes and northern swamp forests.

Large forested ecosystems, ranging from dry through mesic are found in Ten O'clock Line, Rocky Hollow-Falls Canyon and Brock-Sampson Nature Preserves, and in several nature preserves in the Whitewater Valley (Bolling Woods, Duning Woods). Old growth forests can be found at Donaldson Woods (Spring Mill State Park), Meltzer Woods, Wesselman Woods and Shrader Weaver Nature Preserves.

All of the known types of flatwoods are included in the nature preserve system: bluegrass till plain (Chelsea, Guthrie), boreal (Ambler), central till plain (Bryan, Stout, Bell-Croft), dry (Bloomfield Barrens), sand (Bill Barnes) and southwestern lowland (Section Six). An excellent example of a floodplain forest can be seen at Beanblossom Bottoms, and southern swamp forests can be viewed at Twin Swamps, Wabash Lowlands and Buffalo Pond.

Great examples of a karst landscape can be seen at Spring Mill State Park, Mitchell Sinkhole Plain and Donaldson Woods, and caves such as Donaldson's Cave are also found there. Various types of glades and barrens are protected at Leavenworth Barrens and Mosquito Creek (limestone glades), Flint Barrens (chert barrens), Bloomfield Barrens (dry barrens), Lookout Point (gravel slope barrens), Granville Sand Barrens (sand barrens), and Knobstone Barrens, Brock-Sampson, and Black Rock (siltstone barrens).

The rarest types of prairie currently found in Indiana are "black soil" prairie and gravel prairie. Black soil prairies can be seen at Smith Cemetery, German Methodist Cemetery Prairie and Cressmoor Prairie. A gravel prairie has been protected at Wabash Breaks.

Some interesting geologic features are also included in some nature preserves. These include natural bridges (Portland Arch), rock columns (Jug Rock), backbones (Pine

Hills), canyons (Rocky Hollow-Falls Canyon) and waterfalls (Clifty, Hathaway Ross Run, Anderson Falls).

Some of Indiana's interesting trees and shrubs have been protected in nature preserves as well. These include eastern hemlock (*Tsuga canadensis*), jack pine (*Pinus banksiana*), Virginia pine (*Pinus virginiana*), white pine

Lee Casebere

(*Pinus strobus*), tamarack (*Larix laricina*), bald cypress (*Taxodium distichum*), Canada yew (*Taxus canadensis*), mountain laurel (*Kalmia latifolia*), yellowwood (*Cladrastis lutea*) and cucumber magnolia (*Magnolia acuminata*).

Check out the Division of Nature Preserves web site, *www.in.gov/dnr/naturepreserve*, and the web sites of Indiana's various land trusts to learn more about visiting these nature preserves. Some of those mentioned here might not be listed if they don't have sufficient public access. During 2017, and in the years to come, I hope you will visit as many of these special preserves as possible and enjoy these remnants of the "original Indiana" that have been protected for your enjoyment.

John A. Bacone is director of the Indiana DNR Division of Nature Preserves.

Field notes

By Patricia Happel Cornwell

• Indiana Heritage Trust (IHT) has a new name, according to an article in the January/February, 2017, issue of DNR's *Outdoor Indiana* magazine, "Meet the new trust." The entity is now called the President Benjamin Harrison Conservation Trust, a nod to the Hoosier US senator and president. The environmental license plate whose sales fund the land preservation effort will remain the same. Since its inception 24 years ago, the IHT – now the HCT – has preserved more than 70,000 acres in the state.

• The fall, 2016, issue of The Nature Conservancy (TNC) Indiana newsletter *Nature Matters* reports that TNC has developed a video with Indianapolis Zoo to highlight the link between Indiana waterways and the well-being of marine life in the Gulf of Mexico. The video is shown daily during dolphin presentations at the zoo.

• The Native Plant Conservation Campaign, an affiliate of the California Native Plant Society, warns in a December, 2016, email that "noxious weeds" are being disseminated in some seed mixes intended to bolster pollinator populations in the Midwest. Personnel at the University of Illinois discovered the seeds of Palmer amaranth (*Amaranthus palmeri*), also known as "carelessweed," in seed mixes sold to the US Dept. of Agriculture.

• In his column "Quick Takes" in the January/February, 2017, issue of *Bird Watcher's Digest*, Paul Baicich asks "Are we really plant-blind?" He cites studies that show humans are attracted to and appreciate animals, but that most "barely notice" plants

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Propagation

Breaking seed dormancy

By Kevin Tungesvick

In order to propagate native plants from seed, an understanding of seed dormancy is essential. Different species of native seed ripen throughout the growing season during a long period from late April for some early spring wildflowers to the middle of November for many fall wildflowers. Oftentimes, these seeds are dropped at a relatively inhospitable time for germination relative to seasonal weather patterns. While a few species of grasses and sedges germinate readily when fresh, most species have built-in dormancy mechanisms that prevent germination at inhospitable times of the year. Breaking these dormancy mechanisms typically requires the seeds to be exposed to various degrees of cold temperatures and moisture.

Lynne Tweedie

Bloodroot seeds are spread by ants who enjoy tasty attachments called elaiosomes. Ants take seeds to their nest, eat the elaiosomes, and toss seeds in their nest debris, where seeds are protected.

It is most advantageous for seeds in temperate climates like Indiana to germinate in the spring when soil moisture is high and the entire growing season is available for establishment. Therefore, to break their dormancy, most seeds must go through a period of cold to simulate winter conditions. When duplicating this period artificially, it is ideal to store them in a cooler at about four degrees Celsius (39 Farenheit) for 60 to 90 days. This type of storage is often referred to as "cold dry stratification" and is typically sufficient to break the dormancy of most grasses. In fact, a few cool-season grasses such as those in the genus *Elymus* have no seed dormancy at all.

Most forbs (herbaceous flowering plants) and sedges, however, require simultaneous exposure to both cold and moisture, a technique known as "cold moist stratification." Typically, the seed is mixed with a moist medium such as sand or a sterile germination mix. The medium should be moist to the touch but not so saturated that you can squeeze out water. The mixture is placed in an airtight container to prevent it from drying out and stored in a cooler for 30 to 120 days, depending on the requirements for that species. The catalogue from Prairie Moon Nursery in Winona, MN, is an excellent reference for stratification techniques and time periods.

In the western United States, many seeds have their dormancy broken by the heat of a wildfire. In Indiana, one of our small shrubs of savannas and prairies shares this requirement. New Jersey tea (*Ceanothus americanus*) requires a heat treatment to break its seed dormancy. This treatment is readily duplicated: bring a few cups of water to a boil. Remove the water from the heat source and dump the seed into the hot water. Allow water and seed to cool to room temperature before draining off the water and sowing the seed immediately.

In addition to stratification, many species will only germinate in cool soil temperatures, another adaptation to help them establish during favorable spring weather. This is particularly true of spring-blooming species and many woodland residents.

While most seeds can dry to relatively low moisture levels and then imbibe moisture for germination from a moist medium, others lose viability if their moisture level drops below a certain point. Seeds that may be stored dry are referred to as "orthodox seeds" while seeds that are killed by desiccation are known as "recalcitrant seeds." Many of our ant-dispersed spring wildflowers such as bloodroot (*Sanguinaria canadensis*), celandine poppy (*Stylophorum diphyllum*), trilliums (*Trillium* spp.) and Dutchman's breeches (*Dicentra cucullaria*) have recalcitrant seeds.

Developing the appropriate protocols for breaking the seed dormancy of each species is one of the most challenging and reward-

Dormancy – continued at right

Field notes – *from page 3*

although they are "essential habitat" for both animals and humans. He points out that, while plants make up 57% of US endangered species, they receive less than four percent of funding from the Endangered Species Act.

• The Perennial Plant Association has chosen butterfly milkweed (*Asclepias tuberosa*) as 2017 Perennial Plant of the Year, notes Rosie Lerner in the January, 2017, issue of *Electric Consumer*. More information is at *www.perennialplant.org*.

• The fate of the rusty patched bumblebee (*Bombus affinis*) is up in the air. Per *USA Today*, in January the species became the first bumblebee ever placed on the federal endangered species list. But in February, the *Washington Post* reported theTrump administration had halted protections for the species whose population has declined 87% in two decades. Once common in 28 states, the bee is now in only 13, including Indiana. According to the *Post*, the Natural Resources Defense Council has sued the Interior Dept. and US Fish and Wildlife Service for halting the bee's listing without proper public notice or comment.

rusty patched bumblebee (Wikimedia)

• The Jan./Feb., 2017, issue of *The Backwoodsman*, a publication for those who like to "live off the land," has an article on "Autumn Olive" by William Myers that begins, "It truly baffles me sometimes how unpopular this plant can be." Myers disagrees that *Elaeagnus umbellata* is a "noxious invasive weed," citing its profuse production of edible, nutritious berries. He does not address the reasons the species is considered invasive, i.e., its devastating effect on native plant species and habitats. Autumn olive was introduced to the US from eastern Asia in 1830.

Editor's note: Lee Casebere, retired assistant director of DNR's Division of Nature Preserves, has this to say about the scourge of autumn olive: "Autumn olive is widely considered an invasive species by the natural area preservation, management and restoration community. I saw it last summer in surprising numbers in a remote area of northern swamp forest (yellow birch, red maple, tamarack, swamp white oak) at Pigeon River F&W (Fish and Wildlife) Area in LaGrange County. I would never have guessed that it would become naturalized in that habitat. Knowing that it invades that particular community bothers me greatly."

If you see a newsworthy item affecting Indiana species or ecosystems, please send a paragraph, with the date and source where you found it, to journal@inpaws.org.

Dormancy – *from left*

ing aspects of native plant propagation. It often entails several years of failures before the successful combination of stratification periods, soil temperatures and other factors leads to high germination rates. Further complicating this process is variable spring weather which may foster high rates of germination in one year and little, if any, germination the following year in spite of having followed the same protocol. Even closely related species may have very different requirements. For example, the common purple coneflower (*Echinacea purpurea*) germinates easily under a variety of conditions, while pale purple coneflower (*Echinacea pallida*) requires a long moist stratification period and germinates only in cool soil.

So enjoy this challenging aspect of growing native plants from seeds and be certain to record your efforts for future reference.

Kevin Tungesvick is the ecologist at Spence Restoration Nursery in Muncie and a member of INPAWS East Central Chapter.

Prescribed burn from an oak's point of view

By Thomas Gunn

The mighty white oak – *Quercus alba* – stands tall on the hillside. It has weathered many snowy winters, summer droughts and hungry deer nibbling the acorns and the seedlings that sprout from them. On this brisk sunny afternoon, it sees something it has not seen before, a group of humans. They are wearing green pants, yellow shirts and hard hats.

R Kramer

In the weeks before, the mighty oak heard the roar of chainsaws, the buzzing of brush cutters and, earlier this morning, the whir of a leaf blower. What could all this mean? A prescribed burn, of course! Now it all makes sense to our mighty white oak. The chainsaws, brush cutter and leaf blower were used to prepare fire lines along the ridge and down to the stream below, and our white oak is in the middle of it all.

At first, this brings alarm because wood burns and trees are wood. But this oak tree recalls a tale it heard when it was just a young seedling ...

The story goes that in the not so distant past this forest looked much different than it does today. The woods were once open and airy, with plenty of room for winged species such as bats, woodpeckers and migrating songbirds to maneuver between the trees. There was plenty of sunlight and shade that were in perfect balance, allowing oaks and hickories to thrive.

But the oak trees had an unlikely ally: fire. In exchange for fire returning, on average every eight years or so, the oak trees would shower the ground with dry, crunchy leaves every autumn. This meant that when fire did return, it would have a nice layer of dry leaves and twigs to help it in its journey across the woods.

As a fire moves across a forest, the larger oaks and hickories are mostly unaffected because of their thick bark and tapered trunks. However, species such as red maple (*Acer rubrum*) and American beech (*Fagus grandifolia*), with their thin bark, cannot survive the flames. Remembering this, our oak tree looks around at the neighboring beech and maple trees shading out struggling oak and hickory seedlings and wonders if the old story is true.

The humans split up in two groups on the downwind side of the ridge top. The oak tree notices they are carrying cans with little flames and that as the groups move in opposite directions there is a line of fire slowly backing down the hillside. This "backing fire" consumes the layer of built-up leaves and twigs known as "duff" as it burns slowly into the wind.

As the day progresses, the "wildland" (wilderness) fire crew splits up into different roles. A few continue lighting along the edges of the fire line; one is regularly checking, recording and updating the rest of the crew on local weather conditions and comparing that to the forecast; others are patrolling the fire line with tools or water packs to watch for any embers that may try to cross the fire line. At the center of it all is the burn boss, orchestrating the crew, ensuring safety and the accomplishment of the crew's objectives.

Once the fire backs away from the fire line and down the ridge, crew members turn the corner and begin to light along the flanks of the burn area. By igniting while walking into the wind, the crew sees the

Burn – continued at right

Plant sale is May 13

By Tammy Stevens

With spring here, it's time to think about the INPAWS native plant sale and auction! This year's sale is Saturday, May 13, again in the gymnasium at Park Tudor School in Indianapolis, 7200 N. College Avenue, 46240. Imagine a full-size gym bursting with nothing but native plants, just in time for planting.

There will be something for every native plant shopper, from novice to expert. Along with common and hard-to-find native plants, there will be knowledgeable INPAWS members to answer questions.

We will kick off the morning with a half-hour presentation at 9:30 a.m. by Dawn Slack of The Nature Conservancy. A knowledgeable and passionate native plant expert, Dawn will speak about the impact invasive non-native plants are having on our environment and how planting natives helps offset this challenge to our native flora and fauna.

There is a $10 fee for the presentation, but it counts as a $10 coupon toward any auction purchase. Presentation attendees also get to enter the sale at 10 a.m., 15 minutes before the general public.

This year's event will include a book sale with many titles researched by INPAWS bookstore manager Suzanne Stevens.

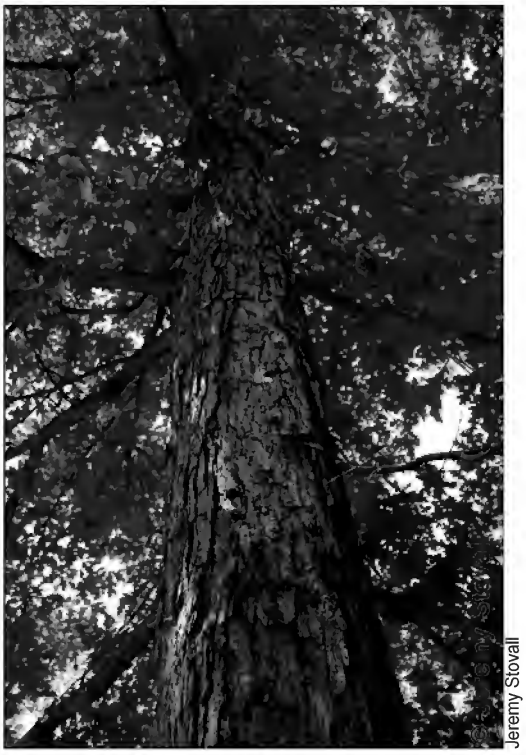
An auction of the finest and rarest plants will begin at 11:15 a.m. The auction is a great way to learn more about natives, as each plant is described by experts for their foliage, preferred growing conditions and unique qualities.

If you have successful natives you'd like to donate, please dig them up a few weeks before the sale so you can settle them into pots and baby them so they will be at their loveliest by May 13. Please label them if possible. If you need help digging, email Dee Ann Peine at *plantrescue@inpaws.org.*

Donated plants should be dropped off at the school from 5 to 7 p.m. the night before or from 7 to 9 a.m. the morning of the sale.

To be part of this fun event, please volunteer by registering online at *www.inpaws.org* > *Gatherings* > *Native Plant Sale & Auction.*

Tammy Stevens and Kelly Spiegel are this year's plant sale co-chairs. You can email them at plantsale@inpaws.org.



Jeremy Stovall

*White oak (*Quercus alba)

Burn – from left

fire behavior increase as the fire changes from a backing fire to a flanking fire. Once enough "black" or consumed fuel is between the active fire and the fire line, the crew begins lighting along the base of the slope. Running with the wind, the flame lengths increase as the fire races up the hill. Called a "head fire," these flames lick at the bark of smaller trees, and the hissing and popping of moisture under the bark can be heard. As the fire approaches the mighty oak, flames scorch the bark on its downhill side, curl around and burn the pocket of leaves on the uphill side at the base of the tree. The oak feels the sting of the fire but the damage is minor. The wound will heal. The mighty oak will live on.

With the sun setting on the horizon, the oak tree looks around at a successful prescribed burn. Other than the smoldering of a few large logs, the smoke has cleared from the air. As the day draws to a close, the oak agrees with the land manager's choice to conduct a prescribed burn. Hopefully, this day's work will knock back the competing trees and allow oak and hickory seedlings to grow, mature and keep this woodland as a diverse oak-hickory forest that will benefit numerous insects, amphibians, bats, birds and flowers.

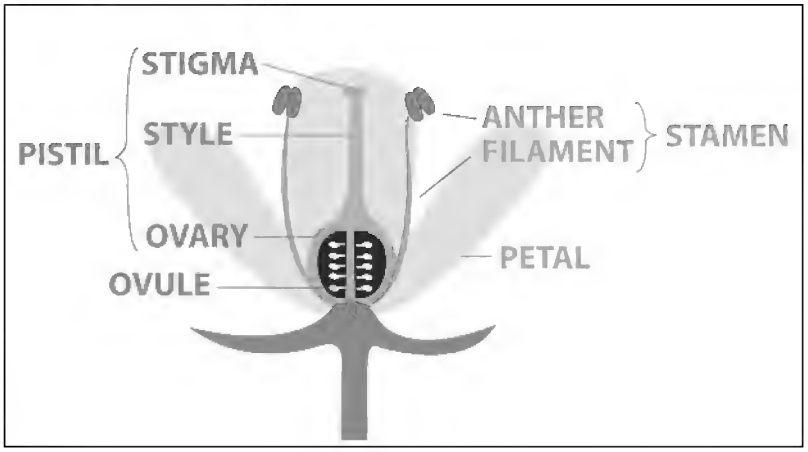
Thomas Gunn is a stewardship forester with The Nature Conservancy.

Flower structure

Botany Basics

By Adrienne Funderburg

Plants clothe their flowers in such a vast spectrum of colors, scents and shapes that it's easy to forget that, no matter how different their appearance, they all perform the same function: aiding reproduction. Each part of a flower performs a function vital to pollination and the subsequent development of healthy seeds. Knowledge of flower structure and terminology can help both professional and amateur botanists understand plant reproduction more fully, identify species and better appreciate the amazing diversity of flowers growing around us.



Heather Holm

The most recognizable parts of flowers are the petals. Often brightly colored and sometimes scented, some species' petals work to attract pollinators and increase the likelihood of cross-pollination. In other plants, such as wind-pollinated species, the petals may lack distinct pigmentation. The petals on a flower are collectively referred to as the *corolla*. While petals may seem simple to identify, they can often be confused with sepals, or the *calyx* of the flower. When the flower is in bud, the sepals cover and protect the rest of the developing structures. Once the flower has opened, sepals often appear as smaller leaf-like structures at the base of the flower. However, the sepals of some flowers, such as tulips, may simply look like an outer ring of petals. Together, the calyx and corolla are referred to as the *perianth*. Many wind-pollinated plants, such as maples (*Acer* species), have reduced petals and sepals or none at all.

The reproductive parts of flowers, usually in the center, are categorized into the *androecium* (male) and the *gynoecium* (female). The androecium is the set of pollen-producing structures; it is made up of a number of individual *stamens*. The stalk of a stamen is called the *filament*, and on top of the filament sits a structure called the *anther*, which produces and carries pollen. The androecium and its pollen are easily observed on flowers such as lilies (*Lilium* spp.).

The gynoecium is a bit more complicated. The primary structure of the gynoecium is most often referred to as the *pistil*, but a single pistil may be made of a single or many fused *carpels*. At the top of a pistil is a sticky structure called the *stigma*, which works to catch pollen for fertilization. The adhesive texture of the stigma holds in place any pollen that lands there, and pollen grains may germinate and fertilize the flower if they are of the same species. From the stigma runs a hollow tube called the *style*, leading into the *ovary*. The ovary contains individual ovules, which produce the egg cells. After fertilization the ovules will develop into seeds, while the ovary will develop into the fruit. In some flowers, the petals, sepals and stamens attach below the ovary, and the ovary is referred to as being "superior." In other flowers, those structures are fused to the ovary and don't diverge until they reach the top. This is considered an "inferior" ovary, but only in terms of its position, not its ability to do its job!

Some gynoecium structures are internal, and some may be covered by other parts of the flower, but they can be observed with a small knife and some careful cutting. You may want to use a magnifying glass or dissecting microscope, if you have one available. Lilies, cherry blossoms (*Prunus* spp.), and daffodils (*Narcissus* spp.) are a few examples of flowers with a large, easy-to-see gynoecium.

Structure – continued at right

Structure – *from left*

All the parts of a flower (petals, sepals and reproductive components) attach to a base referred to as the *receptacle*, which can be recognized as the swollen part located at the top of the flower stem. The flower stem itself also has a botanical name: the *peduncle*.

Large, uncomplicated flowers such as lilies and geraniums (*Pelargonium* spp.) are good specimens for studying flower anatomy because the parts are relatively easy to identify and each flower contains both an androecium and a gynoecium. Flowers with both reproductive sets are called "perfect," while those with only male or only female structures are referred to as "imperfect."

While it can be a diverse and complicated subject, basic flower anatomy can help you form a deeper appreciation for these colorful beauties. Try taking a magnifying glass with you on your way to a garden or on a spring walk and see if you can identify some of these flower parts. You'll be amazed at how much there is to learn and see at every level!

Citation

Bidlack, James E. and Shelley H. Jansky. Stern's Introductory Plant Biology. 12th ed. *New York: McGraw-Hill, 2011. Print.*

Adrienne Funderburg is a junior at Huntington (IN) University, where she studies biology and environmental science. Her favorite Indiana wildflower is butterfly milkweed (Asclepias tuberosa).

Natural History Book Club

By Adam Barnes

From Aldo Leopold to Michael Pollan, E.O. Wilson to Edward Abbey, fiction and biography to poetry – Holliday Park Natural History Book Club has read them all!

Started in 2007, the Indianapolis club is in its 11th year of offering adults a chance to learn about nature and environmental issues through the words of nature writers. Book selections focus on local topics and authors when possible, but subjects have covered everything from feathers to seashores.

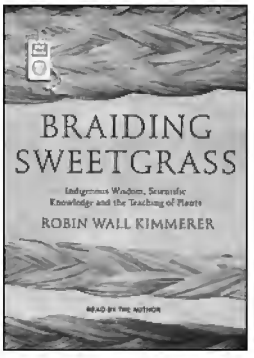
The club typically meets in the library at Holliday Park Nature Center on second Fridays from 10:00 to 11:30 a.m. to discuss a current book and enjoy conversation and company.

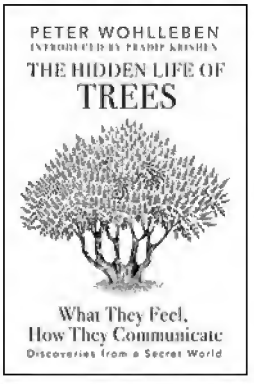
For a complete list of upcoming meeting dates and book selections, visit *www.hollidaypark.org* or call Holliday Park Nature Center at 317-327-7180. The park, an environmental education property of the Indianapolis city park system, is located at 6363 Spring Mill Rd. New members are always welcome.

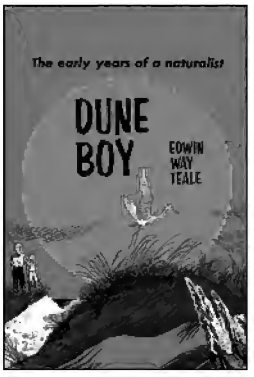
Adam Barnes is manager of Holliday Park.

Book club members, including some INPAWS members, share some favorites:

- *The Brother Gardeners* by Andrea Wolf
- *What a Plant Knows* by Daniel Chamovitz
- *Dune Boy* by Edwin Way Teale
- *Feathers: The Evolution of a Natural Miracle* by Thor Hanson
- *The Outermost House* by Henry Beston
- *Braiding Sweet Grass* by Robin Wall Kimmerer
- *The Golden Spruce: A True Story of Myth, Madness and Greed* by John Vaillant
- *The Hidden Life of Trees* by Peter Wohlleben
- *The Living Great Lakes: Searching for the Heart of the Inland Sea* by Jerry Dennis







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Mission

To promote the appreciation, preservation, scientific study, and use of plants native to Indiana.

To teach people about their beauty, diversity, and importance to our environment.

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Submissions

All are invited to submit photos, articles, news and event postings. Acceptance for publication is at the discretion of the editor. INPAWS welcomes differing points of view.

Please submit text and high resolution photos (300 ppi) via e-mail to journal@inpaws.org. Submission deadlines for specific issues are:

Spring – Jan. 22 for April 1 mailing
Summer – April 22 for July 1 mailing
Fall – July 22 for Oct. 1 mailing
Winter – Oct. 22 for Jan. 1 mailing

Membership

INPAWS is a not-for-profit 501(c)(3) organization open to the public at *inpaws.org*.

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Please direct information of interest to *webmaster@inpaws.org*.

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Letha's Fund gets kids outdoors

By Angela Sturdevant

INPAWS Letha's Youth Outdoors Fund continues to connect children with nature. For the fall, 2016, semester, we awarded $3,322 in grants to five schools and one youth organization, providing outdoor opportunities for over 1,500 students. We've already awarded another $1,856 in grants for the spring, 2017, semester, with more applications coming in on a rolling basis.

This fall, we awarded a grant of $597 to Penn High School in Mishawaka to fund transportation to the Indiana Dunes. On two days in September and October, 357 ninth and tenth graders hiked the West Beach Succession Trail and got to see a waterspout. For many students, this was their first visit to the dunes, even though they live only an hour away. Some had never been on a hike before. They discovered that cactus grows in Indiana and sassafras smells, well, "sassafras-y."

Here are a few memories from the students:

"I've never spent much time looking at the animal and plant life around the dunes, and I've never walked through the dunes before."

"Thank you for allowing us to adventure and learn at the same time!"

#thankful #dunes #sandeverywhere

"I actually connected with my friends outside of my iphone. :)"

"Im glad i got to go because i got to see grass that holds up dirt #sandygrass"

"It was cool to be in a forest with sand. I've never seen trees growing from sand."

"I was glad I got to learn about my surroundings and actually see it rather than read about it in a textbook."

Wikimedia

"Thank you for giving us the chance to spend the day in such an amazing place like the dunes."

Angela Sturdevant is Letha's Youth Outdoors Fund program leader.

Ft. Wayne group creates

INPAWS in action

By Kimberly Miser

The morning of December 8, 2016, was downright chilly. At 7:15 a.m., the overnight temperature had dropped to 22 degrees with 20 mph winds whipping snow flurries around. Daybreak on this morning was gloomy and grey at Southwest Conservation Club (SWCC) on the southern edge of Fort Wayne. Turns out, it was a perfect day for planting.

Alex Cornwell

In brisk weather, Judith Nastally, Nanette and Eddie Coble realize their dream – planting a native prairie.

Because of a grant from INPAWS, a full acre of SWCC's property was being restored to native prairie.

"It was cold, cold, cold. And windy," says Nanette Coble, a Purdue Master Gardener. She and her husband Eddie Coble co-chair the SWCC prairie restoration committee. Huddled together, they watched years of planning and labor take root. "We were excited to watch, but we had to keep darting into our car to keep warm."

On any given day at the SWCC, local police officers use a rare within-city-limits firearms range, archers string bows for target practice and sport shooters launch skeet. Amidst all the sporting equipment, this urban property may seem an unlikely place to find native prairie enthusiasts. Yet conservation is a big part of what this club does.

Founded in 1938 on 37 acres, SWCC encompasses four ponds, a wooded hiking trail, a campground and nature study areas. In 2011 club members began brainstorming ways they could make a large open expanse on their property more wildlife friendly.

"Honestly, I was just tired of seeing weeds," says Eddie.

Plants were donated or purchased, and club and community members pitched in hundreds of volunteer hours to help return a section to a more natural state. They removed invasive species and installed several native plant "welcome" gardens. Work was slow-going and expensive for the member-supported club. It was a start, but it wasn't enough.

In 2015 Southwest Honey Company (SHC), an organization dedicated to public education about bees and other pollinators, set up a four-hive apiary on the grounds. Alex Cornwell, SHC manager, says the bees helped membership think differently about club goals.

By the numbers, SWCC planted

- *45.5 pounds "Pure Live Seed" (PLS)*
- *12 wildflower species*
- *6 grass species*
- *1 cover crop (seed oats)*

"Members started taking ownership of the bees, asking what more they could do to help," Cornwell says.

That's when Nanette received a bit of inspiration. "Bees and prairie flowers go hand in hand," she said. "I looked around and saw few food sources available to the bees." To Nanette, the open parcel of land and weeds in front of their clubhouse started to look less like an eyesore and more like an opportunity.

"I thought the large one-acre area would be the perfect place for a restored native prairie," she said. With visions of attracting birds, butterflies, bees and other pollinators, club members shifted strategy.

"The entire multi-year process brought the conservation club back into conservation mode," Cornwell says.

Eddie said the club discussed ways to obtain funds to help further their conservation cause. The idea of reaching out to INPAWS grew from that discussion. Club members, Purdue Master

one-acre prairie

Gardeners, native plant nurseries and landscape designers all chipped in expertise to help formulate a plan and write the grant.

"We asked for a lot in our grant proposal to INPAWS, almost $1,000," Eddie said. "Honestly, though, I thought we had a 100% chance of success because it was a community effort." INPAWS made a small grant award of $992, the entire amount requested.

Nanette adds, "Before, we were the dreamers. Now we're the doers."

On that cold December morning, their dreams became reality. Heartland Restoration Services, a local native landscape restoration company, brought its heavy equipment and the Midwestern ecotype seed purchased with the INPAWS grant. Mike Van Laeken, director of restoration services for Heartland, said the December date and cold temperature gave the planting a great start to successful germination.

Eddie Coble

"We pick those kinds of mornings because our native seed no-till drill can penetrate that frozen ground," Van Laeken says. "And the snow, along with the frost-thaw cycle, can help push the seed further into the ground."

The seed mixture consisted of wildflowers native to the area and short and tall native grasses.

Van Laeken says that's an important distinction. "We don't bring in species, say, from Texas," he said. "We only use species from sources that will handle the climate of the Great Lakes region."

The Cobles were impressed. "The drill planter looked a bit like a garden tractor, but the process was very precise," Eddie said. "Heartland fully planted that acre. I just can't say enough about its professionalism." Within two hours, Indiana had gained a new prairie.

SWCC is grateful for the INPAWS grant. The club knows its new prairie exists because of investments made by INPAWS members throughout the state, so it takes its stewardship responsibility seriously. Now that the seed is in the ground, other plans can move forward.

Nanette shares the club's five-year vision, which includes a trail through the prairie, a path to the beehives, garden signage and programs. "With the prairie and the apiary, we can educate children about the crucial role native species play in a healthy Indiana ecosystem," she says. "They'll be able to interact with nature in a beautiful, colorful way."

In addition to an increase in educational opportunities, Eddie says the club is excited to see an increase in wildlife. "We can hardly wait for spring!"

Want more information?

Southwest Conservation Club: 5703 Bluffton Rd, Fort Wayne, 260-747-4677

Heartland Restoration Services: 14921 Hand Rd, Fort Wayne, 260-489-8511

Southwest Honey Company: Alex Cornwell, 260-241-6060

Kimberly Miser is communications chairperson of INPAWS Northeast Chapter.

Eddie Coble

At left, Ben Sobczak, field services supervisor, Heartland Restoration Services, loads the native seed mix into the no-till seed drill (above).

INPAWS 2016 Financial Summary

By Don Gorney, INPAWS Treasurer

At publication time, complete chapter financial information was not available for 2016. The financial statements and this commentary reflect only state-level operations.

The financial position of INPAWS remains strong. During 2016, INPAWS had a small operating deficit of $6,135 compared to a small net profit of $2,668 in 2015. At year-end 2016, the organization had liquid cash assets of $63,185 and no liabilities.

Net assets (equivalent of capital or net worth in for-profit accounting) includes temporarily restricted assets of $4,859 for Letha's Fund. "Temporarily restricted assets" is a term used in nonprofit accounting to indicate that these funds are restricted to a specific purpose. Donations to Letha's Fund must be used for grants to Indiana schools or youth organizations to pay for nature-oriented field trip expenses.

Donors – 2016 General Fund

Barbara & George Bolesch
Mary Ann Brady
Jim & Chris Brewster
Jo Ann Bule
Deborah Danzeiser
Susan Ebershoff-Coles
Mary Anna Feitlier
Mary Annette Rose & Jim Flowers
Kristin Fruehwald
Jean Gadziola
Eric Garton
Sarah Gray
Ruth Ann Ingraham
Anne Jay
Donna Keller
James Kincannon
Judith Metzger
Gerry Nagle
Judith Nelson
Noel Pavlovic
Amy Perry
Sue Nord Peiffer
Ruth Reichmann
Raymond & Rita Rust
Stephen Van Zant
John & Martha Bartlow
Mary Weeks

Balance Sheet

December 31, 2016

Assets	
Checking	14,466.87
Money Market	48,718.57
Total Assets	**63,185.44**
Net Assets	
Unrestricted	58,326.02
Letha's Fund	4,859.42
Total Net Assets	**63,185.44**
Total Liabilities	**0.00**

Profit & Loss Statement

Fiscal Year 2016

Income	
Membership	
Gross Membership Dues	23,509.01
Dues Transfer to Chapters	-3,835.00
Total Membership	**19,674.01**
Donations	1,535.00
Total Plant Sale Income	12,521.10
Annual Conference Income	32,090.41
Interest Income	54.94
Letha's Fund Donations	5,550.00
Total Income	**71,425.46**
Expense	
Bank Fees	130.04
Legal Fees	510.00
Credit Card Processing Fees	436.71
Online Fundraising Portal Fees	1,097.50
Education Activities (brochures)	7,516.37
Outreach	208.00
Insurance	2,527.00
Printing and Mailing	1,970.24
Membership Coordinator	1,800.00
Journal Expense	8,303.35
Other Postage	467.77
Website Expense	309.29
Technology Expense	336.95
Office Supplies	54.99
Small Grants	4,074.92
Other Grants	2,500.00
Plant Sale Expense	3,071.38
Annual Conference Exp.	31,555.62
Letha's Fund Distributions	10,154.47
Meeting Expense	337.82
Misc. Expenses	197.89
Total Expense	**77,560.31**
Net Income	**-6,134.85**

President's message

By Mike Homoya

Spring has officially arrived and hopefully wildflowers will be blooming by the time you read this. As I've often said, Indiana has some of the best (perhaps very best!) displays of spring wildflowers anywhere in the world. Each year as I walk into our wonderfully rich Hoosier forests I'm reminded how true it is.

One of the best ways to experience Indiana's "ultimate" flora is to partake of one of the many group hikes occurring this year. Group hikes are a great way to enhance your botanical and ecological knowledge while enjoying the camaraderie of family and friends. Several INPAWS chapters are scheduling hikes, as are various land trusts and the Indiana DNR Division of Nature Preserves (DNP). Be sure to check out their web sites for more information and registration.

One set of hikes I particularly wish to draw your attention to is being offered by the DNP. In partnership with other organizations, including INPAWS, the division is offering more hikes than ever this year in celebration of the 50th anniversary of the Nature Preserves Act and the birth of the division. For more information about this and the wonderful array of protected natural areas, check out John Bacone's article on page 1 of this issue of *INPAWS Journal*. Several of the preserves he mentions will be venues for DNP staff-led hikes this year. (See page 20 for hike information). By the way, John, as director of the division for over 36 years now, has overseen a legacy of natural area preservation. There have been 226 preserves dedicated during his tenure, protecting just shy of a whopping 45,000 acres! And he's not done yet!

While there has been much progress in protecting natural areas, invasive species are a constant threat to their health and integrity. One source of invasive species is the nursery and landscaping trade. Not all exotic plants are invasive but a number of them continue to be sold and used. An important initiative known as "Grow Native" is an effort to educate both plant sellers and buyers on the harmful effects of invasive exotic plants as well as to promote the sale of native plants. Any plant seller who sells native plants can be a Grow Native member, but those who also agree not to sell invasive plants will be certified as "invasive-free" and promoted through the Grow Native web site (*grownativeindiana.org*). Watch this web site and the INPAWS Facebook group for updates.

2017 conference
returns to Bloomington

October 28 will see a return to Monroe County Convention Center in Bloomington. The 2014 annual conference held there was a huge success, with 300 attendees and great facilities. Don't plan any vacations for that date, unless of course they include a trip to Bloomington for the event! Speakers will be announced in the next issue of *INPAWS Journal*.

Know a prospective member?

Email materials@inpaws.org *to request brochures you can give friends or neighbors who are curious about what INPAWS does.*

Chapters keep busy

Central Chapter

Central Chapter is gearing up for a busy 2017 that includes hikes, presentations, outreach and partnerships aimed toward a positive impact on our environment. The potential of our large group is unbounded.

Officers for Central Chapter were elected at the annual January "Ice Breaker," graciously hosted by Ruth Ann Ingraham. President is Jeannine Mattingly, vice-president Crystal Renskers, secretary-treasurer Claire Lane.

Past president Amanda Smith and past vice-president Ben Hess are working alongside new officers to plan a full agenda for the year.

Updates are sent to Central Chapter members monthly, but members of nearby chapters are also welcome.

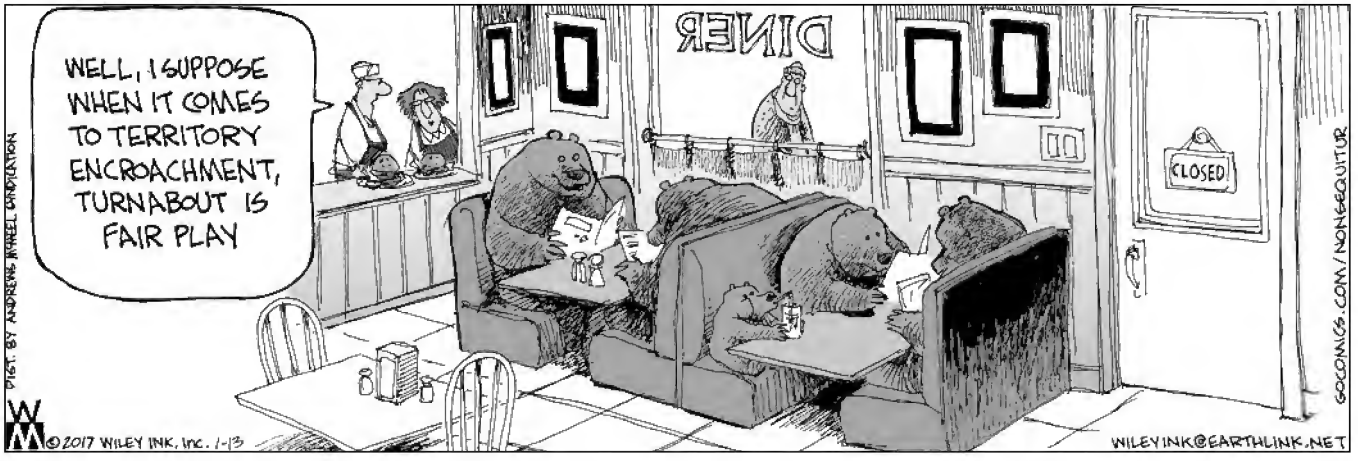
Get to know other native plant lovers and join the camaraderie as we all learn from each other and work toward our INPAWS mission. Send your ideas to chapter president Jeannine Mattingly at *central@inpaws.org.*

Northeast Chapter

In November, INPAWS Northeast Chapter hosted a native plant workshop in Fort Wayne. The event was a joint effort with the Foellinger-Freimann Botanical Conservatory and Little River Wetlands Project (LRWP).

The workshop, which cost $5, was a success; 56 people attended and 30 more were put on a waiting list. Speakers included representatives from native plant nurseries, a landscape architect, LRWP and the city of Fort Wayne.

Homeowners and business owners learned about Fort Wayne's native plant initiative in landscaping and riverfront development; discovered ways to beautify their property while supporting butterflies and bees; and heard how invasive species in their yards affect parks, rivers and nature preserves. Each participant received a seed packet courtesy of Cardno Native Plant Nursery in Walkerton. Because of the level of public interest, organizers repeated the workshop April 1 to another sold-out crowd.



In January, members volunteered in support of two other efforts, an ACRES Trust invasives removal work day at Tom and Jane Dustin Nature Preserve at Huntertown and a species assessment of a wetland outdoor laboratory at Norwell High School in Ossian.

North Chapter

November is always a busy month for North Chapter. It is the month of our potluck dinner and annual meeting. For the past two years it has been graciously hosted by Michael Huft and Charlotte Gyllenhaal at their beautiful home in Valparaiso. About 25 members came together to enjoy fellowship and a variety of homemade dishes. We viewed members' plant slides that represented either questions or highlights from

over winter

2016. Because December is also a busy month, we did not meet, so everyone was looking forward to the January 15 meeting. More than 40 members and friends gathered at the Indiana Dunes State Park auditorium to hear Dr. Noel Pavlovic speak on "The Flora of Indiana Dunes: A Wild and Fascinating Treasure of Plant Life." Dr. Pavlovic, Midwest Region ecologist for the US Geological Survey, has been stationed at the Lake Michigan Ecological Research Station in Porter for 34 years. His research covers a variety of ecological studies including rare plants, restoration, effects of burning and invasive plant species.

Indiana Dunes is one of the richest parks in the country in biodiversity, boasting 1,445 plant species confirmed, among them 233 endangered species and 1,135 native varieties. He also discussed how history has influenced some plants; i.e., the South Shore Railroad Stations (no longer there) and the custom of plant-gathering and poaching that continued there until 1992.

On Feb. 19 Chris Benda, past president of the Illinois Native Plant Society, spoke at Potato Creek State Park about Illinois's floral richness. On March 19 Dr. Scott Bates, a biologist specializing in microbiology who teaches at Purdue University, was North Chapter's guest speaker at Elkhart Conservation Club.

South Central Chapter

A small group of South Central Chapter members met Oct. 22 with Paul Rothrock to hike the trail at Sycamore Land Trust's Scarlet Oak Nature Preserve in Monroe County. Hikers compared scarlet oak with other surrounding oak species, looking at leaves, bark and acorns to identify the scarlet oak. President Steve Dunbar said, "It was a perfect morning to be in the woods with a professional botanist."

On Jan. 21, the chapter had its winter gathering at Brown County State Park, with good attendance despite 60-degree weather. Several members showed pictures of their more interesting nature encounters in the past year. Kay Yatskievych gave a presentation on some of the projects she had been working on for Indiana wildflower identification. The group discussed plans for gatherings and hikes for 2017.

Southwest Chapter

"Starting Native Plants from Seed" was the topic presented by Judy Schneider Kron, a Master Gardener who owns a greenhouse, at the Southwest Chapter's Nov. 19 meeting at Wesselman Woods Nature Center in Evansville.

On. Jan. 21 at Wesselman Woods, a "Chew and Renew" meeting was held for members to update their membership and elect officers. Julie Smith is the new president; Julie Welden, vice-president; past president Laura Lamb, secretary; Pam Drach, treasurer.

Adam Hape presented a program on "Native Plant Activities Online" in two installments at the Jan. 21 and March 18 meetings.

Host plant: Monarda

Wild bergamot (*Monarda fistulosa*) is a summer-flowering member of the mint family that attracts many pollinators. These include bumble bees, honey bees, various beetles, wasps, moths and butterflies. It is the larval host for the hermit sphinx moth (*Lintneria eremitus*) and snout moths (*Pyrausta generosa and P. signatalis*). Its nectar is also sought by hummingbirds. Fairly drought-resistant, wild bergamot grows two to three feet tall and likes sunshine and loamy soil.

Wackybadger

*Above: Wild bergamot (*Monarda fistulosa*)*

*Below: Gray hairstreak butterfly (*Strymon melinus*)*

Lynne Tweedie

Paperless option

If you would like to help INPAWS save money and resources and receive the *INPAWS Journal* electronically rather than receiving a paper copy, please send an email to *membership@inpaws.org* with 'INPAWS Journal' in the subject line, and include your name, mailing address, and email address.

CORRECTION

Jeff Belth, a member of South Central Chapter and author of *Butterflies of Indiana*, alerted us to some inaccuracies in "Binos a boon for butterfly hike" on page 12 of the winter issue. He notes: the photo is a gray hairstreak, not an eastern tailed-blue; monarch eggs do not overwinter; and West Virginia whites only fly in the spring.

Thinking Strategically, Part 3

How Do We Nurture the

By Wendy Ford

In the last issue of *INPAWS Journal*, we considered how INPAWS can help the public understand that native plants are foundational to healthy ecosystems. In the coming months, we will be working on targeted messages for different audiences.

We're especially concerned about how to gain "mind share" with the generation just coming up, many of whom seem to be out of touch with the natural world. Past generations of Hoosiers happily played outdoors for hours, but for today's children — and their young parents — time outdoors has been replaced with "screen time" in front of a TV, computer, smart phone or electronic game. How can these kids develop the bonds with nature that will inspire them to value and care for native plants? Can we create among them ambassadors for biodiversity to carry on the INPAWS mission?

INPAWS has conceived two programs to reach school-age children: the successful Letha's Youth Outdoors Fund and a fledgling Native Plant Wizard patch program.

Letha's Youth Outdoors Fund

INPAWS launched Letha's Fund in 2008 to bring kids to nature; the fund has enabled more than 7,000 school-age children to participate in outings and nature-related projects. Transportation funding enables children to visit environmental education centers, nature preserves and parks under the guidance of trained specialists and enthusiastic volunteers. The fund has also supported such projects as a Girl Scout troop's garlic mustard eradication project, the development of school yard environmental sites, the planting and maintenance of a butterfly garden for kindergarteners at a community center and an experience in the woods for handicapped youth.

Native Plant Wizard Patch Program

Developed in 2014, INPAWS' Native Plant Wizard program guides youth and their leaders through a series of exploratory activities that teach them about native plants. Sessions include the upside/downside of our native poison ivy; a hunt for caterpillars in the forest; a visit to a rain garden that purifies storm water run-off; observation of a wildflower garden or prairie to note what critters they see; learning about plant invaders that crowd out Indiana native plants; and discovering how butterflies use native plants to rear their young. Kids who complete an age-appropriate set of activities earn a Native Plant Wizard patch.

The program has had limited trials in several locales and could be expanded throughout the state with the efforts of regional chapters. We envision the program eventually becoming part of the K-6 curriculum in Indiana schools.

Beyond Letha's Fund and the Native Plant Wizard program, INPAWS has struggled to have a real impact among youth, despite this being a major goal of the 2013-16 Strategic Plan. Leaders of the Youth Outreach team have been challenged to narrow the scope of endeavors to something manageable with their small number of volunteers. The good news is that many other organizations are on the horizon, working toward the same goal (e.g., Indiana Children & Nature Network, Environmental Education Association of Indiana, Project Learning Tree). Through partnerships with these organizations, INPAWS can support their efforts with the expertise and enthusiasm our members possess about native plants.

This brings us to the third major goal of Strategic Plan 2016-2020:

Nurture the Next Generation of Ambassadors for Biodiversity

To reach the next generation, we need to start by educating teachers about native and invasive plants and biodiversity. Most elementary school teachers are generalists and cannot be expected to have this knowledge. But INPAWS has this knowledge and could pilot workshops and develop materials for teachers. In line with this focus on teaching, we have changed the program name of Youth Outreach to Youth Education.

Here are the objectives we have spelled out to fulfill this strategic goal:

Next Generation?

1. **Maintain steady growth in Letha's Youth Outdoors Fund.**
   - Increase promotion among schools and youth groups to generate applications.
   - Increase donations to support additional grants.
2. **Empower INPAWS chapters to engage with schools and youth organizations in their locales.**
   - Designate a Youth Education champion in each chapter and at the state level to promote sharing of outreach ideas and experiences.
   - Cultivate relationships with schools and youth organizations where INPAWS might have an outreach opportunity.
   - Expand the Native Plant Wizard patch program to sites around the state.
3. **Collaborate with other Children in Nature organizations.**
   - Infuse sponsored outdoor experiences with good information about native plants.
   - Verify the accuracy of teacher training materials and participate in training.
4. **Publish a signature book or series on Indiana native plants for school-age children under the INPAWS imprint.**
   - Develop the concept, specifications and budget.
   - Identify authors and illustrators.
   - Release the first book in conjunction with INPAWS' 25th anniversary in 2018.

This article completes our introduction to Strategic Plan 2016-2020. Your INPAWS board of directors and council will be working on an implementation plan for all three of our Strategic Plan goals during the first half of 2017, so stay tuned for updates.

I hope you'll think seriously about which Strategic Plan goal you can support with your wisdom and energy. Contact your regional chapter leader or write to the state leadership. You can find their email addresses on the directory page of every journal issue or at *www.inpaws.org* under *About Us > Leadership*.

Wendy Ford is INPAWS communications chair, webmaster, a member of the board of directors and a member of Central Chapter.

Behind the Scenes

By Wendy Ford

Newly retired from The Nature Conservancy, **Ellen Jacquart** has served as INPAWS' Invasives Education team leader for years. She has lent logistical, moral, and informational support to our organization, including frequent stints on the nominating committee.

Ellen was a founder of Central Indiana Land Trust and a force behind creating the legislature's Indiana Invasive Species Council and the Invasive Plant Advisory Committee. She pioneered the Grow Native program, which incentivizes nurseries and garden centers to feature native plants and not sell invasives. She also founded Monroe County Identify and Reduce Invasive Species (MC-IRIS). Ellen's a thoughtful, well-spoken mover and shaker who makes things happen. We're grateful she's staying on with INPAWS to fight invasives and promote natives.

Above: Ellen Jacquart, left: Davie Sue Wallace

When native plant enthusiasts in southwest Indiana banded together to form a new INPAWS chapter, **Davie Sue Wallace** stepped up to lead them as their first president – and a robust chapter it has proven to be! Right away she spearheaded a deal with Lands' End that lets us order cool stuff bearing the INPAWS logo (see *About Us > Publications & Gear* at *www.inpaws.org*).

Davie Sue now serves at the state level as INPAWS vice president, charged with the support of our regional chapters. Her day job is business development for Pedia Research, LLC, which conducts clinical research studies on pharmaceutical and health care products.

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& Wildflower Society
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DNR Field Days

Indiana DNR Division of Nature Preserves and its partner organizations will offer guided hikes in several state preserves in the coming months. Participation is free, but registration is required at *www.in.gov/dnr/naturepreserve*.

Date	Nature Preserve	Partner	County
April 8	Pine Hills	INPAWS	Montgomery
April 22	Donaldson's Woods & Mitchell Karst Plain	INPAWS	Lawrence
April 29	Burnett Woods	CILTI	Hendricks
May 6	Moraine	SHLT	Porter
May 6	Shrader-Weaver	INPAWS	Fayette
May 20	Clark & Pine	TNC	Lake
May 20	Portland Arch	INPAWS	Fountain
June 3	Yellow Birch Ravine	INPAWS	Crawford
June 24	Mounds Fen	INPAWS	Madison
July 19	Biesecker Prairie	INPAWS	Lake
July 29	Eby Prairie & Elkhart Bog	INPAWS	Elkhart
Aug. 5	Chamberlain Lake	INPAWS	St. Joseph
Sept. 9	Bluffs of Beaver Bend	INPAWS	Martin

CILTI = Central Indiana Land Trust, SHLT = Shirley Heinze Land Trust, TNC = The Nature Conservancy

Wikimedia

Volume 24, Number 2

inpaws journal

Indiana Native Plant and Wildflower Society Summer 2017

Rare plant profile

Prairie hyacinth: *Camassia angusta*

By Catherine Holland

I spent the summer of 2015 waist-deep in a small plot of no-mow prairie conservation near a railroad track that runs parallel to Highway U.S. 52 near Otterbein. I was studying the rare and elusive *Camassia angusta*, commonly known as prairie hyacinth. It is known to have a fairly wide range, growing in Arizona, Iowa, Illinois, Indiana, Kansas, Louisiana, Missouri, Mississippi, Oklahoma and Texas. However, in Indiana it was only known to have grown in the fragmented prairie lands of four western counties: Benton, Fountain, Tippecanoe and White.

Catherine Holland

Ranging from two to three feet tall, this Indiana native is a close relative to the well-known wild hyacinth (*C. scilloides*) whose bright purple flowers light up the understory at Prophetstown State Park in Tippecanoe County in late spring. Because wild hyacinth and prairie hyacinth are so similar in appearance and so closely related, it has brought the true abundance of the latter into question. Currently, DNR lists it as state-endangered, noting that while its global abundance is questionable, it is considered critically imperiled within the state.

Although there is some contention as to whether or not *C. angusta* and *C. scilloides* are really different species, they do have a few key differences. *C. angusta* blooms much later, in early May, with multiple lavender flowers ascending its tall stalk. Unlike *C. scilloides,* which prefers forest soils, *C. angusta* is only found on prairie remnants. Hiding among tall grasses and mustards, its thin green stem is virtually indistinguishable until the plant is in full bloom. The disappearance of our native prairies has made *C. angusta* increasingly difficult to find.

The only population still known in Indiana was incredibly small, only two yards wide by 16 yards long in a prairie remnant along the railroad tracks near Otterbein. After weeks of observations, I began to notice a few interesting things. First, new blooms tended to open between 5:30 and 7 p.m. every day. Second, these plants were exhibiting a high rate of male and female sterility. More than half the blooms failed to produce a fruit, and those that did often contained some unviable seeds. The anthers, on the other hand, had one of two forms of being sterile. Occasionally, the anthers would be fully

Rare hyacinth – continued on page 19

Inside

Plant this, not that:

By Ellen Jacquart

Gardening is a fun and relaxing hobby. Unfortunately, some of the plants available are invasive; that is, these species can move from the garden into our forests, prairies and wetlands, causing a great deal of damage to our native plants and wildlife.

Why not plant natives instead? They are often better adapted to our soils and climates than non-native species, and more and more natives are available for landscaping at garden centers. Information on where to buy natives is at *http://grownativeindiana.org/buy-native*.

Here are a few suggestions for native species you can plant instead of invasives.

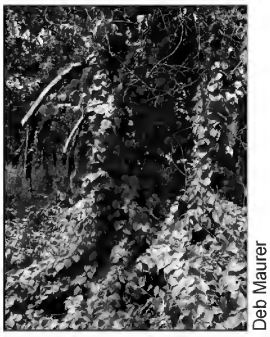
Anita Bracalente

< Plant this

Dutchman's pipe (*Aristolochia tomentosa*) is a climbing vine with golden fall foliage and unusual pipe-shaped flowers.

Not that >

Asian bittersweet (*Celastrus orbiculatus*) is a climbing vine that can move into forest gaps and rapidly cover the forest canopy, ultimately smothering the trees.



Deb Maurer

Fiona Becker

< Plant this

Garden phlox (*Phlox paniculata*) forms dense clumps of 2'-3' tall plants with five-petaled flowers in a wide variety of colors, blooming in June.

Not that >

Dame's rocket (*Hesperis matronalis*) has four-petaled white to purple flowers from April to May and invades forested riparian (river or stream) areas and fens. It appears to be spreading rapidly in Indiana and is often found in "meadow in a can" wildflower mixes.

Ellen Jaquart

Landscaping with native species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< Plant this

Kentucky coffeetree (*Gymnocladus dioicus*) is a beautiful shade tree easily recognized in summer by its huge compound leaves and in winter by its bold outline. It is tolerant of a wide range of conditions.


Wikimedia

Not that >

Planted extensively in urban areas because of its ability to tolerate air pollution and poor soils, tree of heaven (*Ailanthus altissima*) can quickly take over a site and form a very dense stand. Leaves and male flowers have a strong, unpleasant odor.


Wikimedia

< Plant this

Ninebark (*Physocarpus opulifolius*) is a 3'-9' tall shrub with flaky bark and large clusters of white flowers. Some cultivars have dramatic burgundy leaves.

Not that >

Privet (*Ligustrum obtusifolium* or *L. vulgare*) is a shrub that produces berries spread by birds. It forms dense stands in the understory of forests next to creeks and rivers.


Wikimedia


Wikimedia

< Plant this

Black chokeberry (*Aronia melanocarpa*) is a 3'-6' tall shrub with brilliant red fall color and black berries.

Not that >

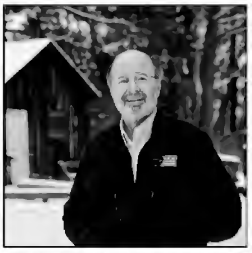
Burning bush (*Euonymus alatus*) is a 3'-6' shrub planted for its red fall foliage. Birds carry its seeds from landscaped areas into forests and woodlands, where it spreads rapidly.

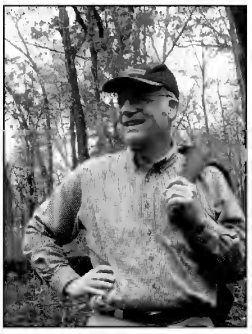

Wikimedia

Speakers announced for Oct. 28 conference

By Tom Hohman

On Oct. 28 the INPAWS conference returns to Monroe Convention Center, Bloomington. Keynote speakers are Dr. Stanley Temple and Douglas Ladd. Other speakers are INPAWS president Michael Homoya, David Gorden and Cheryl Coons.





Top: Dr. Stanley Temple at Aldo Leopold's cabin

Bottom: Douglas Ladd in the field

Dr. Stanley Temple

Dr. Temple is Beers-Bascom Professor Emeritus in Conservation in the forest and wildlife ecology department at University of Wisconsin-Madison. For 32 years he held the academic position once occupied by Aldo Leopold, author of *A Sand County Almanac*. Currently senior fellow with the Aldo Leopold Foundation, he will speak on "Aldo Leopold, Phenology and Climate Change."

Douglas Ladd

Ladd is a conservation biologist for The Nature Conservancy in Missouri. For 31 years he was director of conservation for Missouri. He serves on the boards of the Conservation Research Institute in Chicago, Harris World Ecology Center and Shaw Nature Reserve. He is an adjunct faculty member at Washington University, St. Louis, and a research associate at Missouri Botanical Garden and Morton Arboretum. He is author of two field guides, *North Woods Wildflowers* and *Tallgrass Prairie Wildflowers*. His presentation will be on "Confronting the Darkness: Organismal Biology and Saving the World."

David Gorden, ASLA

Gorden has worked as a landscape architect for Mark M. Holeman, Inc., since 1989. He is past president of the Indianapolis Museum of Art Horticultural Society and the Indiana Chapter of the American Society of Landscape Architects. He will discuss how to incorporate native plants into your "unnatural" setting.

Michael Homoya

Homoya has been a botanist and plant ecologist for the DNR Division of Nature Preserves since 1982. Past president of the Indiana Academy of Science, he is the author of *Orchids of Indiana* and *Wildflowers and Ferns of Indiana Forests: A Field Guide.* He will host a fun trivia game with questions on Indiana's plants, animals, natural areas and more.

Cheryl Coons

Coons is forest botanist for Hoosier National Forest, a steering committee member of the Southern Indiana Cooperative Invasives Management (SICIM) and past president of the Ohio Invasive Plant Council. Hoosier National Forest has 24 "special areas" designated for their geologic, archaeologic or biologic significance. She will describe the unique management measures used to protect these areas.

Venue and hotel

Monroe Convention Center is at 302 S. College Ave. INPAWS has arranged with Holiday Inn Bloomington, 1710 N. Kinser Pike, for specially priced rooms at $99 (plus taxes) for Oct. 27-28. Call 812-334-3252 to make reservations in the "INPAWS" group. To book online, go to *www.inpaws.org*. Reservations must be made by Sept. 29 to get the conference rate.

Friday event

Crazy Horse Food and Drink Emporium, 214 W. Kirkwood Ave., has again been booked for a Friday evening open house. Join us at 7:30 p.m. to meet the speakers and socialize.

Sponsors/exhibitors

Consider becoming a conference sponsor or setting up a display for your favorite non-profit. Non-profit exhibitors are allotted a table for a minimal cost. Details are at *www.inpaws.org.*

Tom Hohman is chair of the INPAWS conference committee and Central Chapter Invasives SWAT Team.

"Grow Native" initiative grows

By Ellen Jacquart

I remember the day I first made the connection. About 20 years ago I was out in a beautiful fen in LaPorte County. Sedges, swamp angelica, bottle gentians … but what was this 12-foot tall shrub right in the middle? I didn't recognize it, but after consulting some plant books I finally figured out it was non-native privet (*Ligustrum obtusifolium*). What the heck was a huge privet shrub doing in this natural area? As I hiked out of the fen, I found out. The preserve's neighbor had a 50-foot long hedge of – privet. The birds were dropping seeds all over the fen, making our control efforts a Sisyphean effort at best. So started my personal campaign against the sale of invasive plants for landscaping.

The sad reality is that most invasive plant species are horticultural escapes from landscaping. Using invasive plants in landscaping, many of which are still available for sale in the nursery trade, works against healthy ecosystems. By overtaking areas and eliminating a diverse mix of native plants, invasive plants harm pollinators and other wildlife, increase erosion and sedimentation in waterways, and even increase tick populations and the rate of tick-related diseases in local communities. The choices we make when landscaping can either sustain or harm the web of life.

Working to reduce the number of invasive plants sold has been a high priority for many who fight the battle against invasives in natural areas. These concerned individuals include members of INPAWS, The Nature Conservancy, Indiana Academy of Science, state and federal agencies, and cooperative invasive management groups across the state.

While we've been pursuing a ban on the sale of highly invasive plants in Indiana, we've also been using education and voluntary programs to slow the sale of these intruders. In 2011 the Monroe County – Identify and Reduce Invasive Species (MC-IRIS) organization started a program to promote the use of native plants in that county's landscaping. Called "Go Green, Grow Native," this program had two levels: any business that sold native plants could be a Basic member, but only those who agreed not to sell invasive plants could become Invasive-Free members. MC-IRIS then worked to encourage Basic members to sell fewer invasives and more natives. A free voluntary program, it was a non-confrontational way to start the conversation with plant sellers about the issue of invasive plants in horticulture.

Terry Howe

As word of the program spread, regional chapters of INPAWS became interested in setting up the same program in their areas. Northeast Chapter started their program in Fort Wayne in 2013; Central Chapter started theirs in Marion and surrounding counties in 2016. Since the program had grown beyond Monroe County, last year I asked INPAWS Council whether they, as a state-wide organization, would be willing to sponsor its expansion throughout the state. They said yes!

"The choices we make when landscaping can either sustain or harm the web of life."

We simplified the name of the program to Grow Native (try saying "Go Green, Grow Native" three times fast) and created a process to certify members and promote participating businesses on a web site. Invasive-Free members get extra promotion in the form of an online "Buy Native" directory at *http://grownativeindiana.org/buy-native.* Basic members are on a simple list on the "Grow Native" web site at *http://grownativeindiana.org/basic-grow-native-members*. All members get a "Grow Native" window cling to put in their business window, but the logo for the Invasive-Free members has a special yellow "Invasive-Free" banner.

Grow – continued on page 18

Japanese knotweed:

Invasive plant profile

By Anna Meer

Japanese knotweed (*Polygonum cuspidatum,* a.k.a. *Fallopia japonica* or *Reynoutria japonica*) might produce sprays of pretty white ornamental flowers during the summer; however, those beautiful flowers arise from a plant that is classified as an invasive noxious weed in eight states. It is incredibly hard to remove, regularly prevents native plants from growing in areas of infestations and often causes damage by growing up through concrete, asphalt and other man-made structures. In short, Japanese knotweed is pretty awful.

Wikimedia

Japanese knotweed was first introduced to the United States in the 1800s. Before landing in the US, the plant was brought to the United Kingdom from Japan. Later it was brought from the UK to the US for use as an ornamental, as fodder and as a method of erosion control. It soon escaped into natural areas and began wreaking havoc in the US.[1]

Hardy by nature, Japanese knotweed tolerates a variety of habitats. These include, but are not limited to, waterways, low-lying areas, waste places, utility rights-of-way and old home sites. Additionally, it is tolerant of high temperatures, high salinity and drought. Though it prefers full sun, the plant can survive in shaded habitats.[2]

Since its introduction to the US, Japanese knotweed has spread to 36 states. It has been documented in Maine, southward along the Atlantic coast, in Louisiana, Wisconsin and various Midwest locations. It has also taken over portions of the Pacific Northwest and moved southward into California and Utah. It has been found in all but 10 Indiana counties.[3]

Japanese knotweed might be a showy plant with dense foliage, capable of growing four to 10 feet in height, but the bulk of the plant exists below ground. In fact, the plant's resiliency is largely due to its extensive rhizome. Rhizomes are root-like networks of stems that grow laterally underground. In Japanese knotweed, the rhizome may reach 45 to 60 feet long, making it incredibly hard to eradicate.[4]

Japanese knotweed is dangerous to native species for several reasons. First, and most importantly, is its persistence. The rhizome allows Japanese knotweed to reproduce asexually and with great success. It is easily introduced from one location to another. In fact, in their article "Elucidating the Population Dynamics of Japanese Knotweed…," Dauer and Jongejans report that a piece of rhizome weighing just 0.7 grams is enough for Japanese knotweed to take root in a new area.[5] Thus, it can be incredibly difficult to remove a Japanese knotweed infestation due to the sheer size of its rhizome – it is a challenge to remove every piece of it. It is equally easy to spread Japanese knotweed to a new location if just one small portion of the rhizome escapes during the removal process.

Second, the large rhizome is a storage

bad news for natives

place for the plant's energy, enabling it to survive extremely harsh conditions. This includes normal winter conditions and more severe natural disasters such as flooding. Japanese knotweed rapidly recolonizes disturbed areas before native species can do so. In fact, Japanese knotweed thrives in disturbed areas due to increased access to light and nutrients.[6]

Finally, this invasive is a threat to native species due to its rapid growth. It spreads quickly, forming dense thickets that block the sun from reaching plants below. It also carpets the ground in a thick layer of decomposing stems and leaves, preventing other plants from sprouting. To further ensure its survival, Japanese knotweed suppresses the growth of nearby competitor plants by releasing toxic or inhibiting chemicals into its surroundings – a mechanism known as allelopathy.[7] Everything about this plant is intended to help it hold on and survive.

Despite its hardiness, it is still possible to remove a Japanese knotweed infestation with persistent treatment. Chemical herbicides are considered most effective. In early- to mid-summer, prior to treatment, stems should be cut down to two inches. Immediately following, a solution of Roundup® (glyphosate) and water should be applied, per directions on the bottle. This process should be repeated with any new growth over the course of the growing season. It should be noted that this method will require repeated application over several years before results may be discerned.[8]

Japanese knotweed closely resembles other invasive knotweed species, including giant knotweed (*Polygonum sachalinense*) and Himalayan knotweed (*Fallopia polystachyum*). Though Japanese knotweed can hybridize with these species, repetitive herbicide treatment is still effective in eliminating the hybrids.[9]

When removing a Japanese knotweed infestation, it is important to remember how easily the invasive plant can be transferred between areas. Proper disposal of plant parts is essential. All stems and rhizomes should be carefully bagged before removing them from a location. Then all parts must be thoroughly dried and burned prior to disposal to prevent regeneration of the plant.

Though it may be tempting to plant Japanese knotweed as an ornamental in your landscaping, the resulting invasion of your property is certainly not worth the beauty of this plant's flowers. Consider instead native species that have some of the same positive qualities, including Virginia willow (*Itea virginica*) and sweet pepperbush (*Clethra alnifolia*).[10] Your yard, your neighbors and your plants will thank you.

Anna Meer is a 2017 graduate of Franklin College with a major in English and minors in biology and creative writing.

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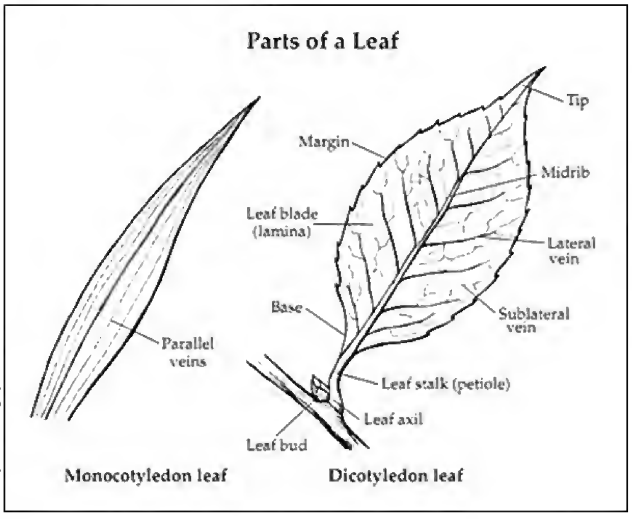
The complex lives

Botany Basics

By Adrienne Funderburg

Compared to the vibrant displays of flowers, leaves may seem mundane, but even a beginner's botanical investigation into this unassuming plant organ reveals unexpected diversity in leaves' forms and uses.

The general function of a leaf is to perform photosynthesis, the process of converting carbon dioxide and water into sugar (Berg 2008). Photosynthesis uses sunlight as its energy source, which "typical" leaves are specialized to collect. There are, however, many plants that use weird-looking, specially modified leaves for functions other than, or along with, photosynthesis. Before looking into the botanical oddballs, a basic overview of more familiar leaves will allow you to see how the organ goes about its primary jobs: collecting sunlight and photosynthesizing.



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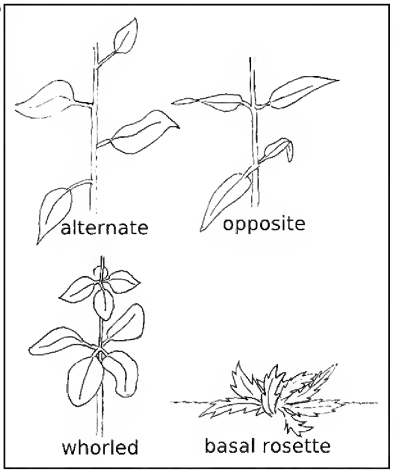


extension.org

Most leaves, notably those of deciduous trees like tulip poplar (*Liriodendron tulipifera*), have two basic parts. The first is the *blade*, which is the broad, thin, recognizable portion of the leaf. Attaching the blade to the stem is the stem-like *petiole*, which holds the blade out where it can have the greatest surface area in the sunlight. *Sessile* leaves are those that lack a petiole and attach directly to the stem instead (Berg 2008). Smooth Solomon's seal (*Polygonatum biflorum*), found in most Indiana counties from April to June, is an example of a plant with sessile leaves.

The upward-facing side of the blade, called the *upper epidermis,* is covered with a waxy coating, the *cuticle*, to limit water loss. The *mesophyll* is the middle tissue layer, where photosynthesis occurs. It is also the tissue through which the veins run, carrying water and nutrients into the leaf and sugars out of it (Berg 2008). The underside of the blade, called the *lower epidermis*, is outfitted with small eye-shaped openings called *stomata* (singular: *stoma*). These tiny holes allow for gas exchange between the air and the mesophyll. When triggered by sunlight or other environmental factors, *guard cells* on either side of the stoma slit fill with water, bowing outward and opening the stoma. Guard cells close their stomata when gas exchange is not needed or when drought conditions require strict water conservation (Berg 2008). To see stomata up close, take clear scotch tape, stick it securely to the underside of a leaf, and gently peel it away. The first layer of cells, including the stomata, should stick to the tape, and a dissecting scope or compound microscope will allow you to see the bean-like stomata and the surrounding epithelial cells.

All basic leaves have stomata, but leaf shape, venation pattern, and arrangement vary between species and are important identification tools for botanists. While there are many different vein patterns in the plant world, the following three are observable in many common Indiana plants. *Parallel* veins run straight down the blade and are displayed in many grasses. *Pinnate-netted* veins are those that branch off from a single major vein that runs the length of the blade,

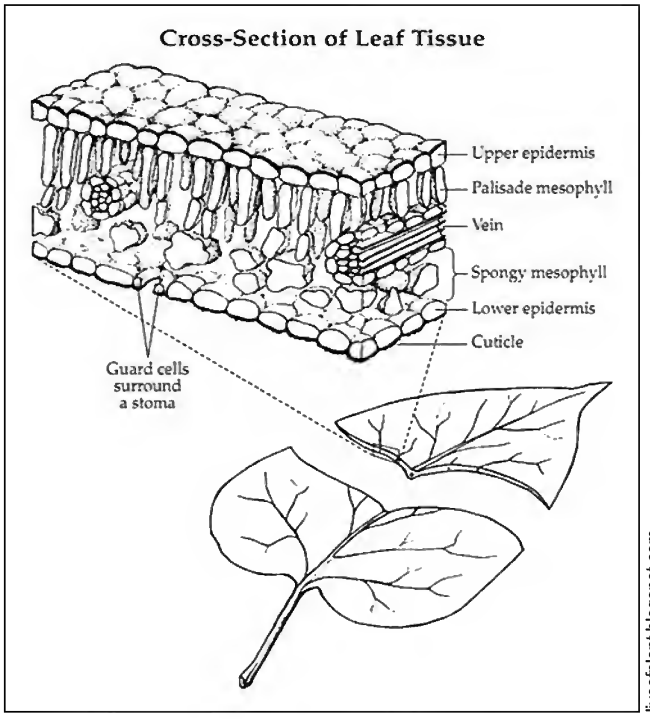
# of leaves

such as on black walnut trees (*Juglans nigra*). *Palmate-netted* leaves are those with a number of major veins branching off from a single point near the petiole, as sugar maples (*Acer saccharum*) display.

For leaf arrangements, leaves that have a single blade per petiole are called *simple*, and those with more than one blade per petiole are *compound*. Compound leaves are tricky because a single leaf is actually made up of a number of leaflets extending from the petiole; they may also be *pinnately* or *palmately* arranged. Pinnate leaves have leaflets all along the petiole, as on walnut trees. Palmately compound leaves have leaflets that stretch out from the end of the petiole, as on Ohio buckeye trees (*Aesculus glabra*) (Simpson 2010).

There are also terms for the ways leaves are arranged on a stem. The common arrangements are *alternate* (back and forth along the stem), *opposite* (leaves directly across from one another), and *whorled* (three or more leaves growing around a single point on the stem) (Berg 2008).

Many leaves do not resemble those of deciduous trees. These leaves often serve their plants in ways adapted for their particular environments. Conifer tree leaves take the form of needles or scales, which have low surface area to reduce water loss. These can survive winter and allow photosynthesis to resume as soon as water and proper temperatures are available. The pitchers and "mouths" of carnivorous plants, found in Indiana bogs and marshes, are also modified leaves that lure and trap insects for nutrients. Some leaves have slightly less extreme modifications. The white waterlily (*Nymphaea odorata*), for example, has stomata on the upper epidermis of its blade, which is exposed to air, rather than on the underwater lower epidermis (Berg 2008, USDA Natural Resources Conservation Service). There are also plants that have highly reduced leaves. Horsetail, or scouring-rush (*Equisetum hyemale*), is one such plant; the leaves are small, dry and encircle the green stem, which is the photosynthetic portion of the plant (Lady Bird Johnson Wildflower Center, Plant Database, 2016).



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Many more examples of odd leaves can be found in your local woods and marshlands. Becoming familiar with common leaf structures, types and arrangements is greatly useful to botanists of every level for identifying species and interacting with the natural world more intimately, confidently and responsibly.

Adrienne Funderburg is a senior at Huntington (IN) University, where she majors in biology and minors in environmental science.

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To promote the appreciation, preservation, scientific study, and use of plants native to Indiana.

To teach people about their beauty, diversity, and importance to our environment.

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President's message

By Mike Homoya

I worry a lot. I shouldn't, I know. It does no good, nor is it beneficial for my health. But while traversing the state this spring, I've seen what Callery pear (*Pyrus calleryana)* and other invasive exotic (non-native) species are doing to Indiana's remnant natural areas. I've seen more and more natural areas being either totally converted to a non-natural state or impacted in ways that degrade their quality. The list is long. It's hard not to be concerned about their future.

Our INPAWS mission statement says that we as an organization "promote the appreciation, preservation, utilization and scientific study of the flora native to Indiana." Why native plants? Is it because native plants have some inherent superiority over exotic species? It's true, native species tend to "behave" themselves here, but exotic ones aren't necessarily bad, just certain ones of them. But it's a competitive world out there in the plant kingdom and some exotics have an unfair advantage. We don't always know which exotic species will be a problem until it's too late to stop them. Therefore, unless they're otherwise proven to be non-invasive or free of pests and diseases, the introduction of exotics is generally to be discouraged. It's not because they're non-native, but because some pose serious threats to the integrity of our natural areas. Our natural areas are the true home of the plants and animals that we call native. It is the community in which they have lived and need to continue to live.

Which brings me back to why I worry. Most people (not INPAWS members!) don't recognize the difference between a natural area and a space that is green with plants of any kind. And if they don't know the difference, they won't care about a quality natural area being overrun by exotics (It's still green, right?). Clearing a forest with a bulldozer is easily seen and understood, but the spread and impact of exotics, not so much. Folks just don't "see" exotics even though they're often right in front of their eyes. The Callery pear is easy to pick out, with its lollypop growth form and white blossoms. The public thinks, "How nice!" We see them and, well, I'd best not repeat here what we think.

I believe this is one of INPAWS' biggest challenges, to call to the public's attention the plight of our remnant natural areas. The more people who know about them, about native plants and the threat of exotics, the more that can be done to protect them. I see this as our highest calling as an organization.

DNR Field Days

Indiana DNR Division of Nature Preserves, partnering with INPAWS, will offer guided hikes in several state preserves in the coming months. Participation is free, but registration is required at *www.in.gov/dnr/naturepreserve*.

t

Date	Nature Preserve	County
July 19	Biesecker Prairie	Lake
July 29	Eby Prairie & Elkhart Bog	Elkhart
Aug. 5	Chamberlain Lake	St. Joseph
Sept. 9	Bluffs of Beaver Bend	Martin

Allen County says no to invasives

By Kimberly Miser

Last year, employees of the Allen County Department of Planning Services (ACDPS) asked a few community experts a simple question: "Can you take a look at this list?" Environmental leaders in northeast Indiana jumped at the chance.

That list, titled "Zoning Ordinance Supplemental Landscape Standards," is a what's-okay-to-plant guide for Allen County. The ACDPS reviews new commercial, industrial and multi-family building plans and offers a recommended plant list to developers and landscapers.

Wikimedia

Japanese barberry (Berberis thunbergii) *was among the invasive species activists helped remove from the county's list of recommended landscaping plants.*

ACDPS specifically wanted to know if the list included invasive species. Michelle Wood, senior land use planner, says it's part of the county's push to feature Indiana-friendly plants.

"I sent the spreadsheet out for local plant experts to review," Wood says. "It was surprising to see how many invasives were hiding on our list."

The project was a success. All invasive pear trees (*Pyrus* spp.) were removed from the list, as well as Japanese barberry (*Berberis thunbergii),* and burning bush (*Euonymus alatus*). Wood notes that Allen County's "Landscape Standards" list is not an ordinance change, but she is hopeful they can make it part of the official administrative manual. Meanwhile, developers are already on board with the changes.

"When developers send us their landscaping plans we suggest changes, like plant an American basswood instead of a Callery (or Bradford) pear," Wood says. She concedes that some developers just want to meet the ordinance, but others appreciate the stewardship. "Once we educate them on why a species is harmful to Indiana, developers and landscape professionals are supportive."

For INPAWS members looking to influence change within their own communities, Wood has some advice. "Not every community has a plan commission. The task of reviewing development plans may fall on one person who's completing other municipal duties," she says. "Ask if you can review the plant standards list." If the community doesn't have a landscape standards plan, Wood encourages INPAWS members to donate their services. "Offer to help create a standards list or, at the very least, a list of invasive or harmful species to avoid."

Wood also encourages talking to local nurseries and offering plant alternatives. "The nursery owner may not know there's a native plant option or a less harmful plant that is just as beautiful," she said.

Another way she suggests to affect change is to connect the local "superstore" with a native plant nursery in the area. "You can ask the store manager to feature native plants or tell them why that pear tree is hurting Indiana's ecology," Wood says. "You can influence buying decisions through education. You never know until you ask."

"It was surprising to see how many invasives were hiding on our list."

Wood is grateful for the expertise of local environmental leaders. "I'm thankful for the reviewers who helped us," she said. "When we recommend trees, shrubs and flowers that are at home in Indiana's soil and climate, the whole community benefits."

Kim Miser is communications chairperson of INPAWS Northeast Chapter.

Field notes

By Patricia Happel Cornwell

• A team of chemists at Indiana University in Bloomington has "engineered a molecule that uses light or electricity to convert the greenhouse gas carbon dioxide into carbon monoxide – a carbon-neutral fuel source – more efficiently than any other method of 'carbon reduction.'" The milestone was reported in the March, 2017, *Journal of the American Chemical Society*. Liang-shi Li, associate professor in IU Bloomington's department of chemistry, is the team's lead scientist.

• The March/April, 2017, issue of *Outdoor Indiana (OI)*, touts the discovery of a new species of spider at Glacier's End Nature Preserve in Johnson County by University of Indianapolis professor Marc Milne. The tiny orange and yellow creature, a member of the genus Oregonetides in the family Linyphiidae (sheetweb spiders), is only 2.5 millimeters (.098 of an inch) across.

• An *OI* article in the same issue, "Native Plant Sales are Springing Up Around State," advises readers that a list of native plant retailers is available at the INPAWS web site, *www.inpaws.org*.

• Keep planting those bird-friendly, berry-bearing native shrubs! The March, 2017, Cornell Lab of Ornithology *eNews* reports that after 40 years of the Endangered Species Act, "70% of listed bird taxa are better off." The data were compiled by the non-profit American Bird Conservancy, which found that the majority of listed avian species were "increasing, stable, or delisted due to recovery."

• Dr. Robbin Moran, one of the keynote speakers at last year's INPAWS conference, will present a seminar on the taxonomy and biology of ferns and lycophytes with Dr. W. Carl Taylor, author of *Arkansas Ferns and Fern Allies*, at Eagle Hill Institute in Steuben, ME, Aug. 20-26. Moran is curator of botany at the New York Botanical Gardens and has taught fern courses in Costa Rica, Venezuela, Bolivia and Ecuador.

• The February, 2017, Xerces Society *Update* says the group has published a report on the effects of neonicotinoids and other pesticides on native bees and other pollinators. You can download the document, "How Neonicotinoids Can Kill Bees," at *www.xerces.org/neonicotinoids-and-bees*. An eight-page guide to protecting habitat from such contamination is at *www.xerces.org/pesticides/agricultural-pesticide-use*. The organization has also recently published a book, *100 Plants to Feed the Bees*.

• Legal protection for the rusty patched bumblebee (*Bombus affinis*), the first bee ever to make the federal endangered species list, had a rocky start. Per reports in the *Washington Post* and other sources, this native bee was named to the endangered species list in January, but in February the Trump administration delayed implementation of protection measures for the species for six weeks. However, in March the hold was lifted. (On a Hoosier note, INPAWS member Debra Young reported in May that she saw a rusty patched bumble bee visiting her flowers in Columbus, IN.)

Marc Milne

Newly discovered in Johnson County, this sheetweb spider measures only .098 of an inch across.

Readers: If you see an item of interest to Indiana's ecosystem in another publication, send a paragraph with source, title and date to *journal@inpaws.org*.

Chapter members listen,

Not sure who took this one

Jill Hoffman, executive director of White River Alliance, addressed members of Central Chapter with a presentation on "The State of Our Waters" in March.

Central Chapter

Central Chapter's first quarter was full of presentations, hikes and celebration of Earth Day. Jill Hoffman, executive director of White River Alliance, kicked off the year with a presentation on "The State of Our Waters" to more than 50 people at the Bier Brewery in Indianapolis March 19.

On April 1, Norma Wallman, author of *Wildflowers of Holliday Park*, led two well-attended spring ephemeral wildflower tours of that park. Among species noted were toadshade (*Trillium sessile*), large-flowered bellwort (*Uvularia grandiflora*), hepatica (*Hepatica nobilis*), swamp buttercup (*Ranunculus hispidus*) and the notorious wintercreeper (*Euonymus fortunei*).

Amanda Smith, past president of Central Chapter, offered a program on "Bird Gardening with Natives" March 18 at Hamilton County East Library and again April 23 at St. Peter's Church, Carmel.

An April 8 hike at Pine Hills Nature Preserve, coordinated by INPAWS and DNR, was led by Andrew Reuter and John Bacone. On April 29, Mike Homoya was the guide for a hike in Burnett Woods Nature Preserve sponsored by DNR and Central Indiana Land Trust.

A "pop-up" garden tour took place on short notice April 17 at the woodland home of Central member Michelle Arfman in Fishers.

With support from INPAWS Council, Central Chapter marked Earth Day April 22 with a "Celebrating Our Pollinators" booth at Military Park in Indianapolis. The booth featured crafts for kids, INPAWS volunteers sharing the importance of native plants to bees and butterflies, and a give-away of milkweed and other native plants to anyone willing to pose as a monarch butterfly and post their photo on social media.

Chapter president Jeannine Mattingly and Ben R. Hess staffed an INPAWS exhibit table at the March 25 Indiana Academy of Science annual meeting in Indianapolis, which was attended by over 350 people.

Northeast Chapter

Spring fever hit the Northeast Chapter hard. In March the chapter invited the public to hear new research about how trees communicate. Sandra Messner from the Indiana Forest Alliance spoke to more than 30 people about how trees connect with each other using underground mycorrhizal fungal pathways. So if a tree falls in the forest, the other trees actually do hear it!

In April, the chapter repeated its popular Native Plant Workshop. With 40 participants, the Fort Wayne workshop was another success. Topics included invasive plants and their impact on Indiana, why native plants are better and how to create wildlife-friendly habitats in small spaces.

Chapter members spoke at the Fort Wayne Home and Garden Show on topics that included how to container-garden with native perennials, backyard biodiversity, and invasives lurking in your yard's landscaping. Members also represented INPAWS at Little River Wetlands Project's Earth Day Fort Wayne celebration and Fort Wayne Botanical Conservatory's four-day Mother's Day plant sale.

Pam George, a coordinator for Allen County's Indiana Master Naturalist program, led an April wildflower hike at Acres Along the Wabash Nature Preserve near Bluffton. Attendees were treated to cut-leaved toothwort (*Cardamine concatenata*), sessile trillium or toadshade (*Trillium sessile*), trout lily (*Erythronium americanum*) and more.

In June, Nate Simmons of Blue Heron Ministries led an invasive species identification hike at Metea Park in Allen County. Afterwards volunteers tackled a new patch of garlic mustard (*Alliaria petiolata*) in the park.

look and learn

(Read about our first go-round with garlic mustard in the fall, 2016, issue of *INPAWS Journal.*)

Southwest Chapter

The first half of 2017 found members of SWINPAWS learning about native plants and conservation both indoors and outdoors. Regularly scheduled meetings were held at Wesselman Woods Nature Center, Evansville.

In January, members elected a new slate of officers: president Julie Smith, vice president Julie Welden, secretary Laura Lamb, treasurer Pam Drach and advisor Davie Sue Wallace.

Adam Hape gave a two-part presentation on "Native Plant Activities Online" at meetings in January and March, discussing nature blogs, the Monarch Waystation program and a citizen science project called the Habitat Network.

In mid-April, members toured the new University of Evansville (UE) greenhouse, hosted by INPAWS members Dr. Anne Powell, who conducts projects in the greenhouse, and Greg Gordon, SWINPAWS member and Master Naturalist. Ouabache Trails Park in Knox County was the site of a late April wildflower hike led by members Terri Talarek King, Mike Broz, Linda Wilcox and Linda Sutterer.

A May meeting featured a talk on the use of rain barrels by Karan Barnhill, storm water coordinator and inspector for the City of Evansville.

In June, members hiked Vectren Conservation Park in Gibson County, led by Greg Gordon and UE biology professor Dr. Cris Hochwender. After viewing an ongoing UE restoration project along the Wabash River floodplain, the group visited the university's native plants garden.

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Letha's story

By Cindy Monnier

Letha Bolles Queisser (1936-2007), an Indiana University botany major, was a wildflower aficionado who helped save huge fields of wildflowers about to be destroyed by development. According to Ruth Ann Ingraham's 2007 *INPAWS Journal* profile, Letha was known as 'Indiana's Wildflower Lady".[1] Not only did she share her knowledge with children, she recruited like-minded enthusiasts to rescue native plants as bulldozers encroached.

Kelly Queisser

Letha in the field with her grandchildren, Elizabeth and Robert Queisser

"With shovels, trowels and plastic bags," Ruth Ann recalls, "we trudged into one precious woodland after another to try and preserve fragments of our treasured heritage of spring ephemerals. The lush wildflower garden that thrives in the dense shade of my beech trees began with plants at what we called Tutweiler Woods at 96th and Meridian" (Indianapolis).[2]

Letha sought out property developers with the help of her husband David, who managed a real estate office and shared his wife's interest. Altum's Nursery approached Letha about working with the Indianapolis Art Center, then called the Art League, at their 67th St. property where they were building the Hurt Sculpture Park. The park was named for Sarah Hurt, an abstract artist and naturalist with 200 varieties of wildflowers in her collection.[3] As a result, many of Letha's transplants were moved to the Art Center grounds in the late 1980s.

Known for taking neighborhood children for nature walks in a nearby park, Letha used jelly beans as incentives for youngsters to learn to identify the plants they saw. Eventually she led Scout troops and school classes on these walks. After her death, with donations made in her honor, INPAWS established the Letha's Youth Outdoors Fund in 2008.

Letha's Fund chair Angela Sturdevant reports that from spring, 2008, to May, 2017, the fund has awarded scores of grants totaling $48,497 to Indiana schools and youth groups for outdoor education projects and field trips. These programs have benefited 14,084 children to date.

Citations

1. IN MEMORIAM Letha Bolles Queisser. Ingraham, Ruth Ann. *INPAWS Journal*, Summer, 2007.
2. Ibid.
3. "Indianapolis Woman Wild about Saving Wildflowers," Julie Goldsmith. *Indianapolis News*, May 18, 1989.

Cindy Monnier is INPAWS membership chair and a member of Central Chapter.

When you have seen one ant, one bird, one tree, you have not seen them all. ~ E. O. Wilson

Letha's grants: your generosity at work

INPAWS Letha's Youth Outdoors Fund made grants totaling nearly $8,900 in school year 2016/17.

Clark County
- ***Wilson Elementary - $600***

Elkhart County
- ***Chandler Elementary - $750***
- ***Chamberlain Elementary - $200***
- ***Goshen High School - $196***

Howard County
- ***Eastern Elementary - $500***
- ***Johnson***
- ***Westwood Elementary - $500***

Marion County
- ***IPS 84 Center for Inquiry - $600***
- ***New Augusta Public Academy South - $195***
- ***Fairbanks Elementary – $250***
- ***Kitley Elementary – $600***
- ***McClelland Elementary – $500***
- ***Indianapolis Math & Science Academy North - $311***

Monroe County
- ***Academy of Science & Entrepreneurship - $675***
- ***Bloomington High School North - $600***

St. Joseph County
- ***Penn High School - $597***
- ***Marquette Primary Montessori - $560***
- ***Greene Elementary - $750***

Donate! Volunteer!

INPAWS in action

For the 2016-17 school year, the INPAWS Letha's Youth Outdoors Fund awarded 18 grants totaling almost $8,900. Most grants were awarded to schools to offset the cost of transportation and fees for field trips to natural areas.

From kindergartners at Holliday Park Nature Center in Indianapolis, to fifth-graders at Charlestown State Park on the Ohio River, to high schoolers at Merry Lea Environmental Center in Noble County, the program connected more than 2,700 students with the outdoors.

Letha's Fund chair Angela Sturdevant says volunteers are needed: "We could use help reviewing applications, writing up summaries of grants awarded, revising the web page and doing outreach." Members interested in helping can contact Angela at *lethasfund@inpaws.org*.

Grant applications are accepted throughout the year, as are your donations. Information on applying for a grant or donating is at *www.inpaws.org/education/letha*. A check, payable to INPAWS with "Letha's Fund" on the memo line, may also be mailed to INPAWS, P.O. Box 501528, Indianapolis, IN 46250.

Delivery mystery solved

Due to an unforeseen problem with our printers and mailing service, some members have not been receiving *INPAWS Journal* on time. While this was out of our control, we regret any frustration it may have caused. We hope we have now resolved the situation.

Members who are up-to-date on their dues should receive the journal about the first of October, January, April and July. If you do not receive it within a week of those dates, please notify us at *journal@inpaws.org*.

Be sure to let us know if you prefer a digital edition rather than a print copy. And, if you do not save your print copies for personal reference, consider giving them to the local library, as some of our thoughtful members already do!

Grow – *from page 5*

As of April, 2017, the program has certified 22 Invasive-Free enterprises (11 retail, three wholesale, eight with limited sale dates, e.g., the INPAWS plant sale) and six Basic members that have added natives but not yet eliminated invasives from their inventory.

Patricia Cornwell

A crowd of about 150 people descended on Park Tudor School, Indianapolis, May 13 for the INPAWS native plant sale, co-chaired by Tammy Stephens and Kelly Spiegel.

Stephens reports that the event netted $11,763 for INPAWS.

If you see an invasive-free plant seller not yet on the list, or if you know a plant seller who sells invasives who might be interested in signing up for Basic membership, let them know they can do so at *www.grownativeindiana.org*.

We will be promoting this online directory of Invasive-Free businesses through Facebook, emails and displays at local garden events. Please help us get the word out by sharing this resource with your gardening friends and patronizing Invasive-Free Grow Native members. These are the plant sellers we want to reward with our business because they have taken an important environmental stand: no selling of invasive plants! Be sure to look for that Grow Native logo with the yellow Invasive-Free banner where you shop for plants.

Ellen Jacquart is a member of the INPAWS board of directors, chair of INPAWS' invasives education committee and a member of South Central Chapter.

Thistle – *from page 20*

where it is commonly seen. This plant does not spread like the invasive thistles, where a group of them is normally seen in full sun.

The native tall thistle is a wildflower that is a biennial or a short-lived perennial. It has a central stem and side stems that are light green with alternate leaves. According to the Illinois wildflower web site (*www.illinoiswildflowers.info*), "the alternate leaves are up to 9" long and 3" across, becoming gradually smaller as they ascend the stems. These leaves are lanceolate, oblanceolate, or elliptic in shape."

Ben identifies an important characteristic to look for: the central and side stems are "pubescent, as are the undersides of the leaves, making them white in appearance. Many of Indiana's native thistles exhibit this characteristic but non-native species lack the abundance of hair."

This plant is host to a variety of birds and insects. I will mention just a few. For the goldfinch, tall thistle's seeds are a staple of its diet. The goldfinch also uses thistle down in nest building. Clay-colored sparrows, indigo buntings, dark-eyed juncos and pine siskins also eat the seeds, making it a valuable food source for many smaller native birds. Bumblebees, hummingbird moths, and butterflies such as swallowtails, painted ladies and fritillaries are some of the insects that are attracted to the nectar of its flowers.

If you are walking along a wooded path in late summer and are lucky enough to come across a single tall thistle, I hope you will take the time to stop and study it. It is one of our rare Indiana gems.

Terri Gorney is vice-president of Friends of the Limberlost and volunteers for DNR at Limberlost State Historic Site in Geneva.

Rare hyacinth – from page 1

formed but fail to open and release pollen; but in some rare cases the anthers would form without any pollen at all. I hypothesized that this infertility was due to the constant inbreeding of such a small population.

Determined to find more specimens of prairie hyacinth, one sunny Sunday afternoon I departed in search of a historic graveyard in Tippecanoe County where it was rumored that a small population had been found years earlier. I pulled my car to the edge of a dusty gravel road and crossed to the cemetery. Not wanting to trespass, I leaned over the edge of a small fence, craning my neck and scanning the space between headstones for any sign of those unusual lavender flowers. To my dismay, the graveyard had been overrun with invasive multiflora rose. There was no sign of prairie hyacinth.

I trudged back to my car, dismayed at the loss of an entire population. Why do species such as prairie hyacinth become endangered? Whole populations can collapse because of fragmentation or loss of habitat and the genetic inbreeding that results from isolation from others of their species.

Perhaps there are more strongholds of *C. angusta* hiding out at the edges of Indiana highways, but to my knowledge there remains only one, a reminder of the fragility of our native ecosystems.

Catherine Holland is a 2017 graduate of Purdue University, where she majored in natural resources and environmental science.

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"Plant Database." Lady Bird Johnson Wildflower Center - The University of Texas at Austin. N.p., n.d. Web. 03 Apr. 2017. Https://www.wildflower.org/plants/result.php?id_plant=CAAN2.

Behind the scenes:
Unsung heroes

By Wendy Ford

Steve Sass

A preservation-minded grassroots activist, Steve co-founded the North Chapter of INPAWS and has served as its president since 2012. He helps to moderate INPAWS' fast-paced Facebook group and co-founded the popular IN Nature Facebook group. He's on the boards of the South Bend-Elkhart Audubon Society and the Friends of the Indiana Dunes; the advisory councils of the Shirley Heinze Land Trust and South Bend Venues, Parks and Arts; and partners with the City of South Bend on sustainability matters as a Green Ribbon Commissioner. Steve speaks regularly to gardening groups and land managers about the importance of native plants and models the role of citizen scientist for elementary school kids. In his spare time, Steve runs his own business as an electronic systems integrator.

Digthedunes.com

Julienne Alford

Suzanne Stevens

We know Suzanne as the queen of the INPAWS book sale, responsible for selecting and ordering books, schlepping them to the native plant sale and auction and annual conference, and overseeing the collection of and accounting for the proceeds. Many also know Suzanne as a gardening fool, presiding over hundreds of plant seedlings in preparation for the gynormous annual Hamilton County Master Gardener plant sale and graciously sharing her beautifully designed private gardens on an INPAWS garden tour. Now Suzanne has added a further jewel to her crown. She's taken on the task of writing timely thank-yous to those who donate to INPAWS!

Wendy Ford is INPAWS communications chair and webmaster.

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Native tall thistle found at Loblolly Marsh

Ben W. Hess

Tall thistle was found by DNR's east central regional ecologist Ben W. Hess at Loblolly Marsh in northern Jay County.

By Terri Gorney

Tall Thistle (*Cirsium altissimum*) is a regal woodland thistle that is native to Indiana. When the early homesteaders arrived in the Hoosier state, they would have seen this plant.

You might walk by this beautiful plant of the Aster family without a backward glance, thinking it is an invasive species. Many people believe it is a noxious weed because it is a thistle. The negative perception of the thistle is not a new phenomenon. The naturalist John Burroughs referred to September as the month of tall weeds. He listed the thistle along with pigweed, ragweed, vervain, goldenrod, burdock, nettles and asters as "outlaws" and "common tramps." But not all thistles are the same! It is too bad that Burroughs did not distinguish the natives from the invasives in his book *Winter Sunshine*, first published in 1876.

Tall thistle likes partially shaded to shaded wooded areas, such as deciduous woodlands or the edges of woodland paths, unlike invasive thistles that like full sun. It can be found in both disturbed and undisturbed areas. True to its name, the plant can grow eight to 10 feet tall depending on the environment. Tall thistle blooms between July and September and blooms usually last one to one and one-half months. The plant usually stands alone.

DNR's east central regional ecologist Ben W. Hess found a single tall thistle August 9, 2016, while working at "Woody's Retreat" at the edge of the woods at Loblolly Marsh. This is the type of habitat

Thistle – continued on page 18

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inpaws journal

Indiana Native Plant and Wildflower Society Fall 2017

Conner Prairie native plantings harken back to pioneer days

By Cathy Donnelly

When William Conner settled along the White River in central Indiana in 1802, he was lucky. He found the only break in an old-growth forest that extended for miles. The land was ideal for farming and became known as Conner's prairie.

Fast forward 200 years: the land now belongs to Conner Prairie, an outdoor living history museum opened in 1964, that interprets and preserves Conner's home, along with early buildings that pharmaceutical entrepreneur Eli Lilly relocated there. The site encompasses more than 1,000 acres on the east and west banks of the White River in Hamilton County, about 20 minutes north of downtown Indianapolis. Costumed reenactors explain the pioneer experience as it was lived in 1836.

Cathy Donnelly

In front of the William Conner House, built in 1823, lance-leaved coreopsis offers nectar and attracts butterflies.

More than half of Conner's original land, farmed for 200 years, is slowly reverting to prairie as part of a 10-year USDA-supported initiative. In 2009, the museum removed invasive plant species and planted a prairie conversion seed mix of tall and shortgrass plants. A two-day BioBlitz of the property in 2013 documented native sedges, grasses and asters, and birds such as Henslow's sparrow (*Ammodramus henslowii*) and sedge wren (*Cistothorus platensis*).

On a wooded bluff above the prairie, Conner Prairie opened a nature walk in 2013. The path includes a four-story treehouse surrounded by interactive experiences and concludes with an observation station that overlooks the prairie. Signs provide information on plants and animals and how the land was used over time. In the future, the museum might extend the walk to include access to the White River.

Inside

At historic William Conner House, built in 1823, Conner Prairie planted a new garden in 2016 that includes a variety of native plants. The garden extends the theme of exhibits inside the house that focus on dramatic changes in early 19th century Indiana as the forest became farmland.

To begin planning this garden, staff talked to DNR botanist/ecologist and INPAWS president Mike Homoya, who visited the property and walked through woodlands south of the house. Though much of the land has been disturbed over time, Homoya found an upland forest where native plants are thriving. He made a list of the plants he saw and encouraged staff to start with native plants that grew onsite.

Conner – continued on page 3

Goal:
4,688 acres of monarch

By Amber Barnes & Julia Kemnitz

You probably know that the iconic monarch butterfly (*Danaus plexippus*) and its spectacular migration are in jeopardy. Their numbers have declined 80 to 90% over the past two decades due largely to loss of overwintering, breeding and migratory habitat. To support the annual migration of up to 3,000 miles round trip from Mexico to breeding sites in the north, monarchs need adequate nectar sources to sustain their journey. Without them, they are at risk of disappearing forever. Monarchs also need milkweed on which to lay their eggs to ensure food for the next generation.

Lynne Tweedie

A monarch butterfly emerges from its crysalis. Monarchs rely on native plants, not only for reproduction, but also to fuel their amazing 3,000-mile migration.

To address this decline, the Pollinator Partnership formed Monarch Wings Across the Eastern Broadleaf Forest (MWAEBF), a two-year project sponsored by a $150,000 matching grant from the National Fish and Wildlife Foundation (NFWF), a nonprofit entity established by Congress in 1984 to support the US Fish and Wildlife Service's conservation mission *(www.fws.gov)*. The remaining $300,000 was provided by many partners across several states who helped match the NFWF grant with labor, time, supplies and financial resources.

Partners in Indiana, Ohio, Illinois and Arkansas are participating to reach the project goal of planting 4,688 acres of monarch and pollinator habitat by fall, 2018. The acreage figure is based on the methodologies to be used and available funding.

The core group of partners includes the Pollinator Partnership, U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program (IL, IN, OH), Indiana, Illinois and Ohio Departments of Natural Resources, Ohio Pollinator Habitat Initiative, Holden Arboretum, Chicago Botanic Garden and the University of Arkansas Center for Advanced Spatial Technologies.

The program is creating a network of volunteer seed collectors who have been trained in seed collection techniques and identification of 20 target plant species that are nectar and host plants native to each participating state. These species will provide a continuous nectar source throughout the growing season. Seed will be processed at a single cleaning center, tested for weeds and germination, then used for seedling propagation or reseeding efforts at project sites.

The boundary for this project is the Eastern Broadleaf Forest Continental Province (EBF-CP). Monarchs do not consider political boundaries in their migration, and the perimeter of the Eastern Broadleaf Forest ecosystem spans multiple state boundaries. Therefore, cooperation among states and their conservation partners will foster an increase in seed resources and ensure locally adapted seed for plantings.

In Indiana, over 100 volunteers were trained earlier this year and assigned to one of 12 collection teams. Since June, they have been going to

20 monarch host plants
(in order of seed production, April-Oct.)

Golden Alexander (*Zizia aurea*)
Ohio spiderwort (*Tradescantia ohiensis*)
Foxglove beardtongue (*Penstemon digitalis*)
Common milkweed (*Asclepias syriaca*)
Whorled milkweed (*Asclepias verticillata*)
Yellow coneflower (*Ratibida pinnata*)
Narrowleaf mountain mint (*Pycnanthemum tenuifolium*)
Ox-eye sunflower (*Heliopsis helianthoides*)
Swamp milkweed (*Asclepias incarnata*)
Black-eyed Susan (*Rudbeckia hirta*)
Partridge pea (*Chamaecrista fasciculata*)
White vervain (*Verbena urticifolia*)
Wild bergamot (*Monarda fistulosa*)
Common boneset (*Eupatorium perfoliatum*)
Tall coreopsis (*Coreopsis tripteris*)
Frost aster (*Symphyotrichum pilosum*)
Giant ironweed (*Vernonia gigantea*)
Late boneset (*Eupatorium serotinum*)
New England aster (*Symphyotrichum novae-angliae*)
Smooth blue aster (*Symphyotrichum leave*)

identified collection sites, including National Wildlife Refuges, county parks and private properties, to scout potential populations of target plant species. They will return to the sites to collect seeds as they mature, continuing into the fall as late-blooming species go to seed.

We are still looking for collection sites and planting locations. If you know a location with an abundance of native plants for seed collection, check the Pollinator Project web site to ensure the place has one or more target species and contact one of the state leaders. *(Go to www.pollinator.org/MWAEBF, find "Download Center" at bottom and click "20 target species with bloom chart.")* If you are interested in your property becoming a planting site, contact Julia Kemnitz at *julia_kemnitz@fws.gov* or Ben Miller at *BMiller2@dnr.in.gov.*

Amber Barnes is a wildlife biologist and program coordinator with the Pollinator Project. Julia Kemnitz is a biologist with the USFWS Partners Program in Bloomington.

Conner – from page 1

A grant from the Indianapolis Garden Club enabled Conner Prairie to work with Spencer Goehl from Eco Logic in Bloomington and Indianapolis landscape architect Darren Reno. Reno drew up the site plan. EcoLogic removed invasives and provided new plants.

In summer, 2016, volunteers planted 1,400 grasses and forbs in the new garden. For the sunny area, Reno chose prairie plants such as pale purple coneflower (*Echinacea pallida*), butterfly weed (*Asclepias tuberosa*) and lance-leaved coreopsis (*Coreopsis lanceolata*).

Along a shadier path, he planted columbine (*Aquilegia canadensis*) and wild geranium (*Geranium maculatum*). In spring, 2017, three eastern redbud trees (*Cercis canadensis*) were planted. What was once a patch of gravel, clay and grass is now a thriving garden that attracts butterflies and birds. Here, Conner Prairie visitors can catch a glimpse of plant species that William Conner likely saw when he arrived in 1802.

Cathy Donnelly formerly worked at Conner Prairie and is now an exhibit developer at the Indiana State Museum and Historic Sites. She has been an avid home gardener for years, but is a new convert to native plants.

habitat

Oct. 28 conference: "Aldo & Friends"

By Tom Hohman

The theme of this year's INPAWS conference is "Phenology, Biology and Saving the World." Full information is in the summer issue of *INPAWS Journal* and at *www.inpaws.org*.

Keynote speakers are Dr. Stanley Temple, professor emeritus in conservation at University of Wisconsin-Madison and a senior fellow with the Aldo Leopold Foundation, and Douglas Ladd, author and conservation biologist for The Nature Conservancy in Missouri.

Other speakers are David Gorden, ASLA, landscape architect with Mark M. Holeman, Inc.; Michael Homoya, author and plant ecologist for the Indiana Division of Nature Preserves; and Cheryl Coons, forest botanist for Hoosier National Forest.

The conference returns to Monroe Convention Center, 302 S. College Ave., Bloomington. Hotel rooms are available at a special rate of $99 at Holiday Inn Bloomington, 1710 N. Kinser Pike. Call the hotel at 812-334-3252 and ask to make reservations in the "INPAWS" group. To book online, go to *www.inpaws.org* and use the link provided. **Reservations must be made by Sept. 29 to receive the conference rate.**

For those arriving early, INPAWS will host a reception and cash bar at Crazy Horse Food and Drink Emporium, 214 W. Kirkwood Ave.

Early registration deadline is Oct. 14; final deadline for advance registration is Oct. 21.

Conference rates: Before/After Oct. 14

Member	$65/$75
Non-member	$80/$90
Student	$35/$40

There will again be a great selection of books and nature-related items for sale. To donate silent auction items or used nature books, contact Suzanne Stevens at *booksale@inpaws.org*. There is still time to become a sponsor or register your non-profit organization as an exhibitor. See *www.inpaws.org*.

Tom Hohman is 2017 conference team leader.

Wikimedia

Aldo Leopold (1887-1948) wrote the seminal book, A Sand County Almanac, *and profoundly influenced the environmental movement with his scientific, ethical and holistic thinking.*

Not all prairies

By Karen Griggs

Prairies are becoming popular in Indiana, but how do prairie restorations and reconstructions compare to the few natural prairie remnants that remain in the Hoosier state? Paul Rothrock and other scientists have conducted studies of the richness of native plants in prairie remnants and prairie restorations since 2005 (Rothrock, 2016). They found that some prairie restorations improve over time in floristic quality, but are not as rich in forbs (non-grass flowering plants) as native prairie remnants.

Editor's note: *A prairie "remnant" is what remains of an original pre-settlement prairie. A prairie "restoration" is a project in which shrubs and invasive species are removed from an area that was originally prairie. A prairie "reconstruction" is one in which a prairie habitat is created where one never before existed.*

Wikimedia – Johannes Bergsma

Prairie dock is among prairie plants that flourish, even in drought conditions, thanks to deep roots and rough leaves.

Prairie plants have a long blooming season and flourish in full sun even in drought conditions, thanks to their deep roots and water-conserving rough leaves. Their dramatic flowers are often held on tall stems. Examples are queen of the prairie (*Filipendula rubra*), prairie dock (*Silphium terebinthinaceum*), rattlesnake master (*Eryngium yuccifolium*), showy tick tre-foil (*Desmodium canadense*), white wild indigo (*Baptisia alba*), coneflowers (*Echinacea* spp.) and royal catchfly (*Silene regia*).

Native prairie remnants can be found in Lake and White counties and other sites in northern Indiana. Prairie plants are show-stoppers in native sites such as the 1,547-acre Hoosier Prairie, a national natural landmark south of Indiana Dunes National Lakeshore (IDNL), and Spinn Prairie in White County on the east side of the railroad, parallel to U.S. 421 north of Reynolds.

According to Tom Post, DNR northwest regional ecologist, Hoosier Prairie Nature Preserve is owned and managed by DNR's Division of Nature Preserves. It is a 715-acre prairie remnant east of Kennedy Ave. and along Main St. in Griffith. It lies inside the boundaries of IDNL. Gaylord Butterfly Tract, owned by IDNL, is approximately 110 acres adjacent to Hoosier Prairie.

Spinn Prairie is a 29-acre natural prairie remnant in White County owned by The Nature Conservancy (TNC). There, visitors can see nice stands of marsh blazing star (*Liatris spicata*).

Jim Beaty, superintendent of the Agronomy Center for Research and Education at Purdue University, gives tours of a 4.2-acre prairie demonstration site in Tippecanoe County on U.S. 52 northwest of West Lafayette, where he explains to local and international visitors that soil science is vital to understanding forest and prairie ecosystems.

Beaty's research used 40-inch soil borings. He found a distinct difference between soils of forest land and the beginning of the open prairie.

"From this point, the prairie stretched all the way (west) to Nebraska," Beaty says. "The prairie soils were formed thousands of years ago by wind-borne deposits of fine soil, or loess." (Beaty, field trip at demo site, Aug. 28, 2013)

The demonstration site marks the boundary between forest and prairie, roughly north to south. The Agronomy Center staff planted the site in 2003 with seeds donated by the University of Nebraska. Beaty and staff maintain the plantings and prevent the invasion of "woodies" with annual burning and removal of invasive mulberry (*Morus* spp.) and cottonwood (*Populus* spp.) trees and other invasive plants.

Beaty points out, "Big bluestem grass (*Andropogon gerardii*) is dominant, along with switchgrass (*Panicum virgatum*). The second most common plants are milkweeds (*Asclepias* spp.) and goldenrod (*Solidago spp.*)."

Beaty observes three stages of blooming by prairie flowers. He states, "They bloom when they are a few inches taller than the grasses

are created equal

like the big bluestem that grows seven to 10 feet tall. The earliest blooms are just above the grass. Then, as the later flowers grow taller than the surrounding grasses they, too, bloom before the grasses catch up to them." (Beaty, field trip, Aug. 28, 2013)

The tallest prairie flower, prairie dock, has a yellow composite bloom on a tall naked stem, 10 to 12 feet above its broad, coarsely toothed leaves that spread on the earth below. It blooms above the late-season grasses.

"[Prairie dock] is my favorite broadleaf," Beaty says. "Compass plant (*Silphium laciniatum*) also has the same height and is recognizable as part of the sunflower family."

Professor Paul Rothrock, now at Indiana University, and a team of Taylor University students conducted research into the species richness of prairie restoration sites. They studied 24 sites to compare the plant diversity of prairie restorations to their plant inventories at natural prairie remnant sites. (Rothrock, "Evaluating Prairies," April 27, 2012, presentation to West Central INPAWS, West Lafayette)

The Rothrock team used Floristic Quality Assessment (FQA) to conduct a formal evaluation of species richness (SR) and species conservatism (C), "an estimated probability that a species is likely to occur in a landscape relatively unaltered" (Swink and Wilhelm, 1979). A low C value means a plant is adaptable to disturbance. A high C means a plant is very faithful to a particular habitat.

Using this approach, the team quantified the species growing on each site by counting the number of plants in a square meter. Their inventory of plant species at prairie remnant sites showed that native prairies have extremely high species densities compared to restoration sites. They found that some species are not found at all on prairie reconstruction sites; therefore "species richness" is higher in native sites.

Why were the prairies lost? Rothrock says the history of prairie loss stems from two technologies: first, from the steel plow, when homesteaders converted natural grazing lands to production agriculture, and second, from drain tiles. (Rothrock, Aug. 27, 2012, presentation to West Central INPAWS)

Reconstruction of suitable prairie sites in the Hoosier state began 30 years ago with seed stock from undisturbed native prairie sites. An early effort was led by the Holcomb Research Institute and Butler University in 1987 when they began a reconstruction for an outdoor laboratory in Indianapolis, now managed by staff of the Butler Herbarium.

In 1993, Taylor University reconstructed a 25-acre prairie site for field-based research across from the campus on land owned by Avis Industrial Corporation in Upland in Grant County. There, Adam Thada researched plant diversity and prairie restoration in 2013, using cutting, burning and herbicide methods. As part of his master's studies in environmental science at Taylor, he led a team to identify seedlings and study the biomass at the Upland Prairie Restoration. A major finding was that big bluestem grass was overly dominant at the site. (See "INPAWS funds forbs in prairie restoration" by Thada in the spring, 2014, issue of *INPAWS Journal*.)

Karen Griggs

A monarch butterly patronizes butterfly weed, a native prairie plant.

In his 2012 talk, Rothrock said that when he compared early restorations to current efforts, success is now more likely than in the 1980s for two reasons. First, planters demand more variety in seed mixtures. Second, local genotypes are now available.

Prairies – continued on page 6

Prairies – *from page 5*

In the old method of restoration, mostly grass species were planted, and the mix consisted of approximately 12 species. Sometimes seeds and seedlings had to be obtained from other states. Now more species are in the seed mix, and the site is prepared carefully. Weeds are controlled; more flowering plants (forbs) and fewer tall grasses are planted.

Management at prairie sites is complex. For instance, at DNR-owned Elkhart Bog in Elkhart County, a neighbor to the nature preserve planted a prairie buffer bordering the state property and added further protections to his land in the form of a conservation easement. On this site, as well as on all managed prairies, fires are used by specialists to keep small trees and shrubs from invading the prairie grasslands.

Karen Griggs

Tall cup plant in bloom

Two large northern Indiana prairie reconstructions rich in forbs provide wildflower lovers and scientists with dramatic vistas that evoke pioneer experiences: Kankakee Sands and Prophetstown State Park.

Kankakee Sands, established by TNC in 1995, is a massive prairie and savanna restoration in northwestern Indiana, totaling 7,800 acres. It is located near Willow Slough Fish and Wildlife Area along US 41. The site extends from Indiana, near Morocco in Newton County, to northern Illinois's black oak barrens in Msokda Land and Water Reserve. TNC has begun a long-term restoration site complete with seed harvests, greenhouses and plantings.

In 2016, American bison were introduced at Kankakee Sands. The 23-head herd is a major addition to the restoration because bison, wolves and other wildlife were part of the original ecology. (Allen, 1967)

At Prophetstown State Park in Tippecanoe County, prairie plantings bloom lavishly from May through October. The park opened in 2004, and hikers, cyclists and campers enjoy 1,000 acres of prairie flowers, as well as the Farm at Prophetstown, an authentic historical reconstruction of a 1930s farm with tours of the farm, barn, livestock and meadow.

Angela Manuel, naturalist at Prophetstown State Park, can attest to the growing popularity of native plants. One thousand of the park's 2,300 acres are in prairie restoration. The Dept. of Natural Resources grew 18,000 prairie plants in the park's greenhouse this year, and this spring park visitors bought 3,500 native plants. Garden lovers at the Master Gardeners Expo at the Tippecanoe County Fairgrounds bought 4,000 more. The rest were planted in the park. (Manuel, interviews, July, 2017)

Until frost, these prairies have acres of blooms, from the purple of asters to the yellow of goldenrods and the blue of the state-threatened prairie gentian (*Gentiana puberulenta*). Bees, butterflies and birds flock to these plants for pollen and seeds, as they must have done before the arrival of settlers.

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Karen Griggs is a technical writer in West Lafayette and a member of INPAWS Central Chapter.

Who was Jane Brooks Hine?

By Terri Gorney

I was first "introduced" to Jane Brooks Hine while transcribing conservationist Maurice McClue's notes for *Natural History Memorandum (1919-1957)*. McClue, an Angola attorney born in 1907, mentioned Jane and her bird notes in his journal. This piqued my interest. No one in the Indiana birding community knew anything about her when I began my research in 2008.

Jane Brooks was born in 1831 in Lake County, OH. She attended Oberlin College and became a teacher until her marriage in 1857 to Horatio Hine. The couple had six children. In 1861, they moved to land in northern DeKalb County that Horatio's father had bought in the 1830s. The land had been left pretty much in its natural state, a perfect habitat for a lifelong student of nature such as Jane.

Through my friend Bob Wilder, I found some of Jane's descendants and discovered that she kept birding journals and wrote poems. These relatives, Jean Faulkner and Maynard "Butch" Hine, generously allowed me to copy her journals.

The ink in the first journal was so pale that I needed to digitalize it to read it. It was written in the old-fashioned English of the 19th century. Reading Hine's journals was like reading a slice of Indiana history. Some of her writings were dated and others were not. Most, I believe, are from the 1880s and 1890s.

She wrote of her family's homestead, "This farm in part lays [sic] between two Heronries. The largest is a mile and a half north near where our swale joins Cedar Creek just above Cedar Lake, the other, two miles south at a pond called Indian Lake."

In another entry, Hine noted, "Those [willow] patches and black-ash grasses were strung here and there like occasional beads on a thread; but the greater portion of the swale like to cover[ed] its bosom with sword grass, bull rushes [sic], cattails and sedges."

Jane described "at least 20 snipes eating on the [roots of] flags" (wild irises) on their farm for four days in April, 1884. An avid naturalist, she got up in the night to watch them feed by the full moon.

On March 5, 1891, Jane recorded, "The Acadian Flycatcher arrives here early in May and remains through the summer to work for the interests of those who own forests containing beech trees and as such forest[s] are the rule here, we have the birds quite evenly distributed."

Elsewhere she advised, "If you have tangles of shrubbery on your lawn, or berry patches in your garden, [the catbird] may raise a brood near your house."

In her time, Jane was a well-known lecturer and writer. She became known as the "Bird Woman of Indiana." She contributed to Amos Butler's *Birds of Indiana*, 1898, but her best-known writing was her chapter in the 1911 *Biennial Report of the Commissioner of Fisheries and Game for Indiana*, entitled "Game and Land Birds of an Indiana Farm."

Jane has over 400 bird sightings listed in the American Phenology Bird Project on www.*USGS.gov*. She was a member of the National Ornithology Society, which published a booklet as a memorial to her after her death.

In 2009, I was honored to be asked to teach in the persona of Jane at the Allen County Indiana Master Naturalist class on early naturalists. I think Jane would be pleased to know that she is still teaching in the 21st century.

Terri Gorney is vice-president of Friends of the Limberlost. She volunteers for DNR at Limberlost State Historic Site in Geneva.

The Watery Road to Heron Town

No barren road
Leads travelers on
Its dusty way
To Heron Town:
But
Tangled willows,
Sweet swamp roses,
Sword grass meadows,
Bogs of rushes,
Wild flag blossoms,
Wiry sedges,
Stately cat-tails,
Ferns and mosses
Line all the road
That stretches on
Its swaly path
To Heron Town.

Jane Brooks Hine (1831-1916)

Naturalist profile

Cattails – Wikimedia

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Mission

To promote the appreciation, preservation, scientific study, and use of plants native to Indiana.

To teach people about their beauty, diversity, and importance to our environment.

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President's Message

By Mike Homoya

My wife Barbara and I had the opportunity this summer to visit the herbaria of the New York Botanical Gardens (NY) in the Bronx and the Field Museum (F) in Chicago. At NY and F we viewed preserved specimens of two very special plants, *Orbexilum* (*Psoralea*) *stipulatum* and *Thismia americana*. Neither has been known to occur in Indiana, but the site for the *Orbexilum*, a.k.a. Falls of the Ohio scurf pea, was a stone's throw from Clarksville on a bedrock island in the Ohio River. The *Thismia* population was west of Lake County, a couple of miles from our state line. *Thismia* is a mycoheterotroph (its sole energy supply is via a fungal pathway) and the scurf pea is a legume (member of the bean family). These unusual plants have two things in common. They are known only from the site where they were first discovered, and both are thought to be extinct, having last been seen alive over 100 years ago. Though it may sound gloomy, like visiting a crypt in search of botanical mummies, it was thrilling to see them.

Seeing those two species recharged my hope that they still exist somewhere in the wild. Very possibly, the next discovered population of either could be in Indiana. We certainly have habitat similar to where they grew. All the more reason to protect what's left of our natural landscape. Just think, you may be the one to find them!

On that same trip to NYC we enjoyed a walk on the popular High Line, a former elevated rail line transformed into a pedestrian park and greenway. While not all plants used along its border are natives, a high percentage are. Similarly, we observed several native plants along the Chicago Riverwalk and in Millennium Park's Lurie Garden. While millions (yes, millions) of users of these parks may think the landscaping consists of "meticulously landscaped weeds," many will stop and look more carefully.

Do these parks even come close to having the diversity of plants and animals of a natural area? Clearly not, but their value lies in exposing users to the beauty and value of native plants and natural areas. Awareness of indigenous plants *is* getting through, dear readers. Thank you all for your work in making it happen. See you at the conference!

(1931 – 2017) Daniel J. Anderson

By Betsy Wilson and Ruth Ann Ingraham

INPAWS recently lost a dedicated member, Daniel Anderson, who died May 26. Dan and his wife Sophia (1925 - 2014) were charter members who dedicated long-term commitment to what they valued.

Volunteering was a way of life for the Andersons. Dan served many years as our education chair. Both advocated the use of native plants and staffed booths at the Flower and Patio Show, Orchard in Bloom and Earth Day. As active members of INPAWS and Master Gardeners, they took responsibility for two public native plant gardens, one next to Indiana State Museum and the other behind the nature center at Holliday Park. Dan helped landscape the corner of Binford Blvd. and 71st St. in northeast Indianapolis. Educators at heart, they gave talks and slide shows to various clubs.

Dan Anderson (top) at the INPAWS Earth Day booth, Indianapolis, 2017; Sophie Anderson at Shaw Nature Reserve, St. Louis, 2005

A rustic cabin in the woods of Owen County, with a pond and small meadow, was Dan and Sophie's get-away. At their "farm" they planted a small vegetable garden, explored the woods and dug ferns and flowers to donate to plant sales sponsored by INPAWS and Master Gardeners.

What most of us did not know is that Dan, as well as Sophie, sang in several choirs and that the Children's Museum had honored them both for over 25 years of volunteer service.

Dan and Sophie were endowed with the spirit of volunteerism. They are missed.

Betsy Wilson is a member of Central Chapter. Ruth Ann Ingraham is a co-founder of INPAWS and currently serves as historian and as a member of the board of directors.

Chapters on the go

INPAWS In Action

Southwest Chapter

In April a partnership including SWINPAWS installed pollinator gardens at seven Vanderburgh County schools and Burdette Park. A $535 grant from Vanderburgh County Soil and Water Conservation District will be used to certify the schools' wildlife habitat gardens with the National Wildlife Foundation. The gardens will serve as an outdoor lab and will allow children, as well as teachers and parents, to gain hands-on experience with native plants and the pollinators that depend on them. The certifications will help Vanderburgh County toward its goal of becoming a Certified Wildlife Friendly/Monarch Community.

On May 20 Gena Garrett, curator of education for Wesselman Nature Society, led SWINPAWS members on a tour of the "Nature Playscape" at Wesselman Woods Nature Center in Vanderburgh County.

The Playscape is a 3/5-acre fenced and landscaped area designed to give children, from toddlers to age 12, unstructured play time outdoors. The land, once farmed, is adjacent to Wesselman Woods, the 200-acre old-growth forest in the center of Evansville. The Playscape will be planted with primarily native Indiana species. More information is at *www.wesselmannaturesociety.org.*

Central Chapter

April showers bring May flowers and lots of hikes, talks and outreach activity for this chapter. In April, Amanda Smith shared her knowledge and passion for native plants at St Peter's Church in Carmel, whose property provides habitat via native prairie and wetland plants. In May, Sand Creek Elementary School, a past recipient of an INPAWS grant, hosted a native plant and pollinator program also led by Amanda.

An event was held in Noblesville to welcome newcomers, and members have experienced the many uses of native plants in everyday landscaping through short notice "pop-up" tours in April and May. Special thanks to Michelle Arfman, Bill McKnight and Barbara and Irv Goldblatt for sharing their time, experience and yards. More pop-up tours are in the works.

Members including Mike Homoya, Ben Hess and Bobby Kimball led hikes at the Hoosier Outdoor Experience in June while Barbara Homoya, chapter president Jeannine Mattingly and Bobby conversed with folks who visited the INPAWS booth.

North Chapter

Spring began a season of North Chapter field trips arranged by Nathanael Pilla. In May, led by botanist Adam Blazer, members visited Pinhook Bog, a property of Indiana Dunes National Lakeshore. It is about 100 meters from the gate that admits one into the bog itself. The moat surrounding the bog is populated with buttonbush (*Cephalanthus occidentalis*) and lizard's tail (*Saururus cernuus*). Water covered the boardwalk as guests stepped carefully so as not to lose their balance. Wild calla (*Calla palustris*) bloomed brilliantly and lake sedge (*Carex lacustris*) stood tall along the water's edge.

The boardwalk is a constant reminder of the fragile ecosystem of the bog. Poison sumac (*Toxicodendron vernix*) was nestled among highbush blueberry (*Vaccinium corymbosum*). Of course, everyone comes for the carnivorous plants and orchids. Northern purple pitcher plant (*Sarracenia purpurea*) was a stand-out, along with three different bladderworts (*Utricularia* spp.) and two types of sundew (*Drosera* spp.). But the orchids stole the show for most of us.

In June the chapter visited Jasper-Pulaski Fish and Wildlife Area for a tree hike. District forester Carmen Dobbs led the hike and, though rain threatened, Carmen kept the group positive. The group saw tulip poplars (*Liriodendron tulipifera*), our state tree. Straight and tall, this tree was used by Native Americans for canoes, by pioneers for lumber and later by Europeans who came to Indiana to buy wood and ship it back to Europe for homes and furniture.

As we walked on we saw a couple of non-native trees, black alder (*Alnus glutinosa*) and Osage orange (*Maclura pomifera*). Osage orange can be a pesky tree with its messy fruits, unusable wood and painful thorns. The hike was less than a mile, but took two hours. The gray day turned into a cheery time together.

Northeast Chapter

On July 20, Northeast Chapter members helped tag invasives for later removal at Norwell High School's 25-acre environmental lab in Ossian in Wells County. INPAWS awarded a $1,000 small grant to Northern Wells Community Schools in

Trailside plant survey meets need

By Barbara Tibbets

Potato Creek interpretive naturalist Tim Cordell had a final project or two on his park bucket list before retiring last year, and a $1,000 INPAWS grant made one of those dreams come true. A trailside plant list has been generated and seven detailed brochures will soon become available to park and web site visitors to encourage their appreciation and understanding of the natural beauty of one of Indiana's most biologically diverse state parks.

When Tim applied for an INPAWS grant in 2016, the goal was to create a list of all of the "flowers" a visitor might encounter while hiking the trails of the park in St. Joseph County. The target audience was persons with little or no knowledge of plants. The list would include herbaceous plants, grasses and sedges that produced flowers large enough to catch a visitor's eye, and perhaps a few floristically showy shrubs. The list was not intended to be a comprehensive scientific survey, but rather a useful guide to help fuel a visitor's knowledge at the moment a trailside flower sparked interest.

Scott Namestnik, senior botanist with Orbis Environmental Consulting and a neighbor to the park, was hired to conduct the survey. He identified three growing seasons: spring (March – June), early summer (June – July), and late summer (July – October). He developed a species list for each of the park's seven hiking trails that included scientific and common names, the plant's native or non-native status and relative abundance.

Namestnik said, "A total of 528 vascular plant taxa were identified to at least the species level along the trails. Native taxa along the trails ranged from 124 along Trail 6 to 274 along Trail 4. While Trail 4 had the most total and native taxa, Trails 2 and 3 had the greatest natural area quality, as measured by the Floristic Quality Assessment."

After conducting the survey, Namestnik shared that he was "actually pretty amazed by the species richness along some of the trails." He made some "good finds" along the way, such as starry campion (*Silene stellata*), as well as a hybrid violet, *Viola x brauniae*, that was a first record for St. Joseph County.

Because of the knowledge and attention to detail Scott brought to the project, as well as his familiarity with park trails, the list is rather comprehensive and will provide an important tool not only for visitors, but also for park naturalists and others with an interest in botany.

Members of the Friends of Potato Creek State Park (FPCSP) and park staff thank INPAWS for funding a project that will benefit tens of thousands of visitors who enjoy the park each year. Without this money, the project would have remained an unmet visitor need.

The brochures being developed by staff and members of FPCSP will be available by November. Our hope is that equipping visitors with a brochure as they hike will inspire or rekindle an interest in plants. An appreciation of park flora, including an awareness of native vs. non-native species, might then foster a willingness to participate in invasive plant control projects and other conservation efforts.

Scott Namestnik

Starry campion (top) and the hybrid violet Viola x brauniae *were among the "good finds" made by botanist Scott Namestnik while surveying the flora of Potato Creek State Park near South Bend.*

Barbara Tibbets is an interpretive naturalist at Potato Creek State Park. A graduate of the Purdue University wildlife science program, she worked as a naturalist and natural resources manager at Turkey Run and Shades State Parks for 26 years before transferring to Potato Creek in 2016.

Chapters – from left

2016 to reclaim the neglected property for student use. (See "School reclaims rare woodland lab" on page 12 of this issue.)

Members held a picnic Aug. 26 at a private home in Noble County, where they observed a prairie with over 100 species of native plants and an alternative septic system that uses native wetland plants to treat wastewater. Following the meal, members carpooled to Glacial Esker Nature Preserve in Chain O' Lakes State Park, home to several state-endangered plants.

School reclaims rare

INPAWS In Action

By Kimberly Miser

The cross-country team of Norwell Middle/High School in Wells County has enjoyed a nearly untouched wetland all to themselves for 20 years. But when the team runs the trails at eight miles per hour, some of the charm and raw beauty can be lost on teenagers. All of that is about to change with a little help from INPAWS.

Gene Donaghy

Volunteers who helped tag invasives for later removal at the Norwell Middle/High School outdoor lab included, from left, Kate Sanders, Indiana State Parks volunteer coordinator Jody Heaston, Betsy Yankowiak and Martha Ferguson. Sanders, Yankowiak and Ferguson are members of INPAWS Northeast Chapter.

In 1997 the board of Northern Wells Community Schools (NWCS) purchased 25 acres of woods adjacent to the school to create an environmental lab. Additional trees were planted, some areas burned, a few benches installed and a trail created. However, when the school changed its block schedule a few years later, class time went from 1.5 hours to 45 minutes. Outdoor study was no longer feasible for the school's 725 students in grades nine to 12. Other than the cross-country team, no one used the wooded area and it fell into disuse within a few years.

Gene Donaghy runs those trails, too, but recreationally. Lately he has taken notice of what surrounds him and sees opportunity. "We've got a real gem out there; it just needs some help," he said.

Donaghy, a graduate of Norwell High School, serves on the school board and on the Northeast Indiana Regional Development Authority. "I wanted to know if the woods were worth reclaiming as an environmental center," he said. "And I knew just who to call."

He called Betsy Yankowiak, director of preserves and programs for Little River Wetlands Project in Fort Wayne and co-director of stewardship for INPAWS Northeast Chapter. In summer, 2016, she joined Donaghy and Scott Mills, NWCS superintendent, to evaluate the site. Of the school's 25 wooded acres, Yankowiak identified four acres as a wetland, pointing out uncommon plant species. "Quite honestly, I didn't even know what we had," Donaghy said. "But when Betsy got excited, I knew we had something good."

Donaghy's next call went to Jody Heaston. Heaston, Indiana State Parks volunteer coordinator, works out of Ouabache State Park, less than 30 minutes from Norwell High School. For a school to own a 25-acre woods and wetland is rare, but Heaston knows that is not enough to ensure success.

"To create a true environmental study lab, we'd need interpretive signs for the habitat, trees and wildflowers," Heaston said. She envisions programs that involve math, biology, science, art and language, plus an environmental club. "It's crucial that we solicit input from teachers and staff and enlist professional help from the state to develop a curriculum."

Heaston also coordinates the state's Indiana Master Naturalist Program (IMN). "Our 'IMNers' are always looking for stewardship opportunities," she said. Volunteer projects will include plant identification, tagging invasive species for later cutting and treating, widening trails and planting. She notes that Yankowiak's involvement opens another volunteer pool: "Having the Northeast

woodland "lab"

Chapter helping to push this project forward is a big win."

Donaghy loves Heaston's other ideas, such as setting aside space for a pollinator garden and using the school's greenhouse as a factory for growing starter plants of native species. But he wants to think even bigger. As a member of the Regional Development Authority, he's inspired by projects that increase quality of life for area residents.

"Eventually, I'd like to hook the Norwell acreage to the Poka-bache Connector Trail," Donaghy said. The Poka-bache, once completed, will connect Pokagon and Ouabache state parks and will be the longest trail in Indiana. "With the kind of exposure the trail will bring, we can be the model for how community government, educators, volunteers and environmentalists can come together to create something wonderful."

"When Betsy got excited, I knew we had something good."

Northern Wells Community Schools received a $1,000 small grant from INPAWS this year to revitalize both the Norwell High School tract and a smaller outdoor lab at Ossian Elementary School.

With input from Yankowiak and Heaston, Donaghy has developed a planning wish list for the high school property and recruited help from a scout troop, the local US Department of Agriculture office, Future Farmers of America (FFA), and the Wells County Purdue Extension Office.

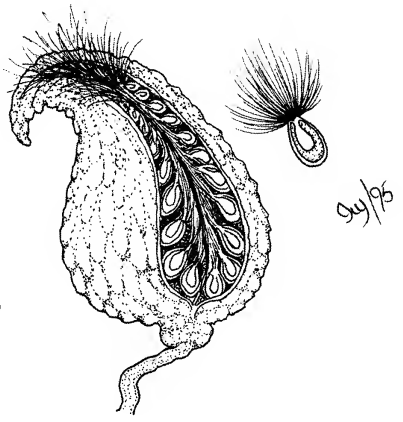
Donaghy said, "FFA members have been hand-cutting brush and we've scheduled a burn to discourage some invasives. The project benefits the Bluffton Fire Department, too. It's using the burn as a training exercise."

Summer brings fresh excitement for all involved in the project. Heaston knows the woods and wetland will reveal surprises. "Now that we're watching," she said, "I know we'll make new discoveries. Do we have sensitive or rare plants? The next two seasons will be exciting."

Donaghy promises the trails will remain open for cross-county use. "Cross-country coaches from other schools tell me it smells different running through our woods with all the flora and fauna. It's such a great place. With community involvement, we can make it even better."

Kimberly Miser is communications chairperson of INPAWS Northeast Chapter.

SEED SWAP!



This year INPAWS will host a seed swap at the October 28 conference! If you have native plants that set viable seeds, please collect some to share. After drying and cleaning seeds, place them in wide-mouth plastic or glass jars with tight-fitting lids and label clearly with full common name, county where grown and, if you know it, scientific name. Deliver to the Cook Group Room, first floor of the Convention Center, no later than 8:30 a.m. Oct. 28. You will receive a card identifying you as a seed supplier, which will allow you and one companion to become seed swap consumers during the first program break. During later breaks the seed swap will be open to all. (See page 3 for more information on the conference).

Gardening seminar Oct. 7

Hendricks County Master Gardeners will host their annual seminar with the theme "Four Seasons" Oct. 7, 9 a.m. to 3:30 p.m. at Hendricks County 4-H Fairgrounds, 1900 E. Main St., Danville. The seminar is open to the public, but pre-registration and payment of a $45 fee are required. The fee includes a buffet breakfast 7:30 to 9 a.m., a picnic lunch and all materials. Register at *HendricksGardeners.com*.

Prairie dock thrives again

By Chad Bladow

In an August 13, 1984, memo to John Bacone, director of the DNR Division of Nature Preserves, state botanist Mike Homoya describes a visit to Henderson Park owned by the City of Salem, Washington County. He notes that limestone glades and barrens occur in the northeast part of the park, exceptionally rare plant communities recognizable by the presence of broken, shaley limestone with little or no soil and scattered trees. He also notes that he found unusual plants like prairie dock at the site, a prairie plant that can thrive in these open communities of southern Indiana.

Fourteen years pass by and Allen Pursell of The Nature Conservancy successfully negotiates a conservation easement with the city of Salem in 1998. TNC now owns the rights to manage the glades and barrens as part of the Twin Creek Valley Preserve. But lots of searching at the site found only a couple prairie dock plants of the hundreds photographed in 1984.

The glades and barrens had grown dense with underbrush and cedar trees during the past 14 years, shading out all the sun-loving plants.

Most of the cedar and understory clearing work was completed by 2004. The small remnant barrens area was burned again in March 2001 and March 2003. Hundreds of hours and lots of sweat went into clearing and burning this site - would the prairie dock respond?

August 13, 1984. Prairie dock surrounds Cloyce Hedge and Brian Abrell at Twin Creek Valley.

Mike Homoya

July 17, 2000. In the same small barrens remnant as pictured at left, no prairie dock is visible.

Ellen Jacquart

Ellen Jacquar or Allen Pursellt

March, 1999. Volunteers clear cedar trees from the barrens at Twin Creek Valley.

Ellen Jacquart

2001. Following two prescribed fires, prairie dock is still not present in the barrens remnant (same downed tree shown as above).

at Twin Creek Valley

Yes! By 2006 the prairie dock was again growing in a large patch within the barrens remnant, though the plants were smaller than in the 1984 photo, and none was flowering.

It was 2008 before we saw the first flowering plants, and prairie dock now numbers in the hundreds and is recovering across the barrens and glades. The hard work and cooperative effort of the City of Salem, Indiana Division of Nature Preserves, The Nature Conservancy and volunteers has paid off with the rejuvenation of this exceptionally rare habitat. The work continues today to conserve the biodiversity found at Twin Creek Valley.

This cycle of burning and regrowth will continue. This will be necessary for the lasting conservation of the significantly rare barrens and glades found in just a few special places in southern Indiana. It will take the continued dedication of The Nature Conservancy, our partners and most importantly the support of the people who love and care for our natural world.

Chad Bladow is director of southern Indiana stewardship and the prescribed fire manager for The Nature Conservancy's (TNC) Indiana chapter. He has worked for TNC for over 17 years, helping guide the care of the Conservancy's land and setting it on fire when appropriate.

August 21, 2004. The downed tree is barely visible. A few prairie dock plants are now back.

Bonnie Wolf

August 27, 2015. Prairie dock thrives again at Twin Creek Valley.

Chad Bladow

Elizabeth Mizell

August 1, 2013. The remnant barrens has recovered four months after a prescribed burn.

Chad Bladow

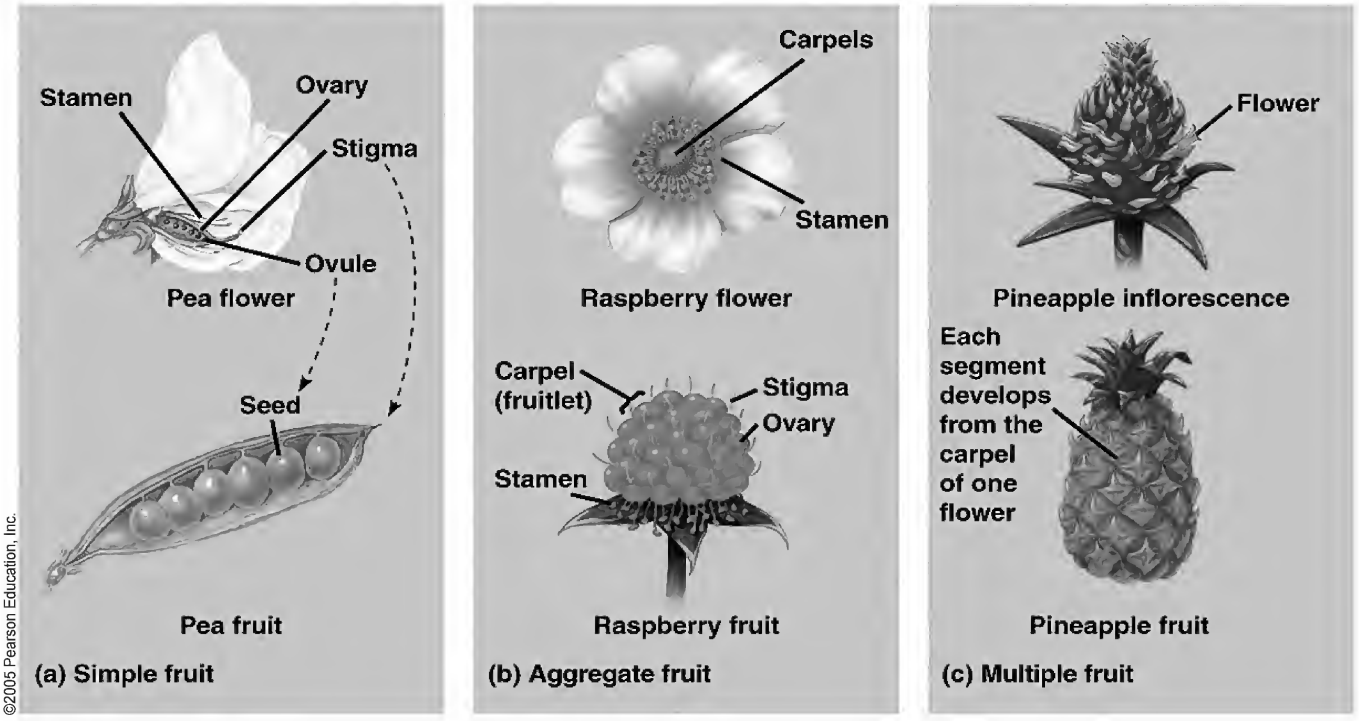
November 3, 2015. Following a prescribed fire, the southern glade appears in the background.

Fruits: the familiar

Botany basics

Adrienne Funderburg Newsome

It's hard not to appreciate fruit. Like flowers, fruits delight and amaze us with their diversity of forms, adaptations and flavors. But as much as we love fruit, plants are dependent on them. Fruits work as seed protectors, dispersal vehicles and embryo nutrition for the plant, and each type of fruit is specially equipped for its roles so populations may spread and species live on.



While there is a bounty of beautiful and bizarre fruits to study, this article will present common terminology for describing fruits and native examples of the types discussed. An internet or library search will show you many more types of fruits (and botanical oddities) than we can present in this space, but here are the fruit basics to get you started.

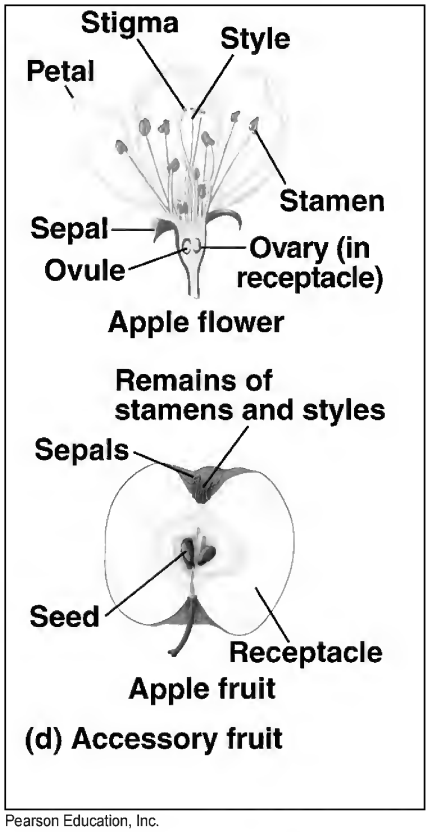
A fruit begins to form when the ovule of a flower is fertilized; the ovule itself will become the seed, and the ovary, which surrounds the ovule, develops into a fruit. The original structure of the flower greatly affects the resulting fruit, and botanists break fruits into four categories based on how they form from their flowers. Flowers with one carpel (the female part of a flower composed of stigma, style and ovary) or many fused carpels develop into *simple* fruits. If a flower has many individual carpels instead, the carpels may grow after fertilization and fuse into a single *aggregate* fruit. In some species, multiple flowers grow close together, and their carpels begin to fuse after fertilization. The resulting fruit is called a *multiple* fruit. Lastly, *accessory* fruits are those in which the fruit is formed from more tissues than just the ovary.

Fruits can also be *fleshy* or *dry*, which as you might have guessed, describes the texture of their tissues. If you think of fleshy fruits, blueberries (*Vaccinium* spp.) may come to mind. Blueberries are a good example of *true berries*, simple fruits that are fleshy throughout. Strangely enough, tomatoes (*Lycopersicon* spp.) are also true berries. (This makes ketchup a bit of an odd condiment!)

and the far out

Other fruits that we call berries, such as raspberries (*Rubus* spp.), are not true berries because they are not simple fruits. Raspberries are aggregate fruits, arising from carpels that fuse post-fertilization. Each round fruitlet of a raspberry developed from a single carpel. Mulberries (*Morus* spp.) are also false berries; the fruits develop from the ovaries of multiple flowers, making them a great native example of a multiple fruit. Pineapples (*Ananas* spp.) are another familiar multiple fruit, but are only native to grocery stores and the occasional greenhouse in this region.

Strawberries (*Fragaria* spp.) are also false berries. When you hold a strawberry in your hand, you are actually holding approximately 200 tiny fruits settled into the ruby-red flesh of the enlarged receptacle (where the flower attaches to the stalk). In this way, what we normally consider the fruit of the strawberry is actually an accessory fruit, made up of other flower tissues, and each "seed" on the outside of the strawberry isn't a seed, but a fruit of its own with a seed inside. Not only are there lots of fruits on a strawberry, but the whole delicious structure develops from a single flower with many independent carpels, making a strawberry an aggregate-accessory fruit.



Pearson Education, Inc.

The "seeds" on strawberries are actually dry fruits called *achenes*. Achenes have seeds that are connected to the fruit wall at one location inside the wall, rather than at two or more points. Sunflower "seeds" are also achene fruits; the dry shell is the fruit wall, which we peel or crack open in order to eat the seed. All achene fruits are simple, and they are also *indehiscent*, meaning they do not split open at maturity.

Nuts are another type of simple, dry, indehiscent fruit, but they differ from achenes in that the fruit wall develops into a stony shell. This wall is easily recognizable in the acorns produced by oaks (*Quercus* spp.) and in walnuts from eastern black walnut trees (*Juglans nigra*).

Our last fruit types are dry and simple, but are *dehiscent*, meaning they split open to release their seeds at maturity. *Follicles* split open along one suture and *legumes* split along two. Milkweed (*Asclepias* spp.) fruits are a familiar example of follicles, and the remains of their split husks and fluffy seeds can be seen from late fall into wintertime. Redbud (*Cercis canadensis*) is an example of a legume.

There are more fruit types and terms to be discovered with a bit of research. Next time you go out to the grocery or on a walk, see how many of these and other types of fruits you can spot and name.


Wikimedia

Milkweed follicles (top) and redbud legumes (bottom) are examples of dehiscent fruits that split open to release their seeds.

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Berg, Linda. Introductory Botany: Plants, People, and the Environment. 2nd ed., Brooks/Cole, Belmont, 2008.

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Adrienne Funderburg Newsome is a senior at Huntington University, where she studies biology and environmental science. Blueberries are her favorite Indiana fruit.

Hiking – *from back cover*

ledge among various ferns and rock fir-moss (*Huperzia porophila*) sprouts the only known occurrence in the entire state of prickly tree clubmoss (*Dendrolycopodium dendroideum*). Mike advised us against maneuvering the cliff face for a better look, as had been done decades before when the clubmoss was discovered and sampled.

Samantha Ransdell

Hikers at Yellow Birch Ravine were excited by discoveries such as a long-tailed salamander (above) and the state's only known occurrence of prickly tree clubmoss (right).

Shortly after, our group reached the end of the ravine. There we found Horseshoe Falls, a high rock overhang funneling several streams of water to the ravine below. The falls are a great place to stop for a rest before returning to the parking lot.

For those whose interests include animals, Yellow Birch Ravine doesn't disappoint. The creek provides habitat for amphibians such as the wood frog (*Lithobates sylvaticus*) and long-tailed salamander (*Eurycea longicauda*). Ebony jewelwing damselflies (*Calopteryx maculata*) flit over the water, and the keen-eyed observer may spot a candy-colored rosy maple moth (*Dryocampa rubicunda*) or its tentacled caterpillar. Birders will enjoy hooded warblers (*Setophaga citrina*) and Louisiana waterthrushes (*Parkesia motacilla*), while fossil-lovers can see good examples of crinoids and the screw-like *Archimides* bryozoan.

Despite the lack of trails, Yellow Birch Ravine is not a strenuous walk, but hikers should expect to clamber in and out of the creek bed several times. This geological wonder is well worth the muddy boots.

Eden, Samantha and Taylor Ransdell are nature enthusiasts from the South Central Chapter of INPAWS.

IPA grant to help restore Limberlost

By Terri Gorney

Nestled in northern Jay County is the 465-acre Loblolly Marsh, one of Indiana's natural gems. The farmer who once owned part of the land called it "the armpit of Indiana" as he had continuous problems with flooded fields. It's all in your point of view! This area was a remnant of the old Limberlost Swamp, and even with ditching and draining, it was never meant to be farmed.

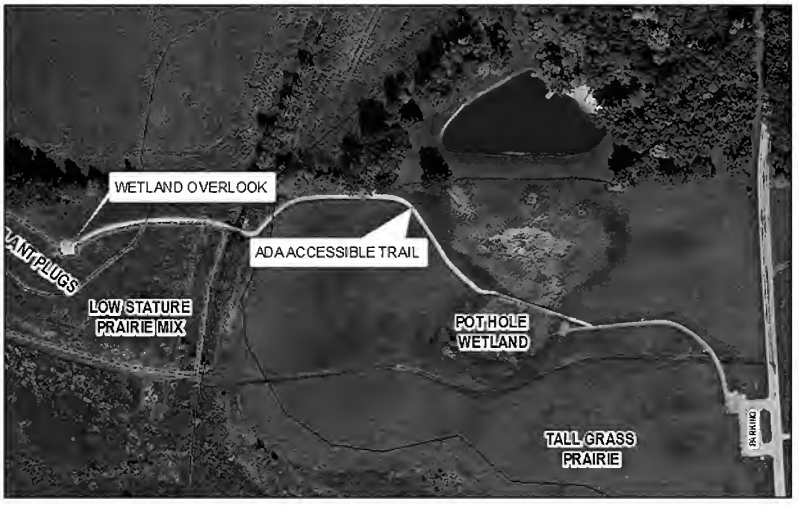
In 2012, Loblolly Marsh was dedicated as the 250th State-dedicated nature preserve by then-governor Mitch Daniels. DNR east central regional ecologist Ben W. Hess has an office at the visitor center at Limberlost State Historic Site in Geneva.

The Friends of the Limberlost help DNR's Division of Nature Preserves (DNP) care for Loblolly Marsh and other preserves in the Limberlost Territories — restored wetlands and uplands totaling 1,700 acres in northern Jay County and southern Adams County.

On August 20, the Friends received the wonderful news that they had been awarded a project grant from Indiana Parks Alliance (IPA) to enhance an area of Loblolly Marsh. Our IPA project, "Restoring the Limberlost Wetlands and Prairies with Native Plantings," provides money to purchase native plant plugs and seed mixtures. DNP staff and Friends volunteers will provide the labor.

We will focus on high-profile areas such as the Wetland Overlook, which in the past provided a view of Engle Lake. Today the lake has vanished, the result of a 22-year effort to drain Limberlost Swamp from 1888 to 1910. To make these natural areas more appealing, especially for visitors who enjoy seeing and photographing wildflowers, DNP and the Friends will plant more native flowers around the overlook and along Veronica's Trail, a handicapped accessible trail that takes visitors from the Loblolly parking lot to the Wetland Overlook. Native wildflowers will attract more insects and birds, creating more diversity and better habitat. With an additional Heritage Support Grant from Indiana Historical Society, Friends will also put an interpretive sign at the overlook.

Ben W. Hess and I worked together on the IPA grant. Ben is a botanist with a vast knowledge of plants, seed propagation and land management. He created a list of native plants appropriate for the type of soil and the quantity of plants that would be needed. Some of the species are golden alexander (*Zizia aurea*), Culver's root (*Veronicastrum virginicum*), prairie dropseed (*Sporobolus heterolepis*), butterfly weed (*Asclepias tuberosa*), and "Low Stature Prairie Mix." Spence Restoration Nursery in Muncie was our source for plugs and seeds. (See Ben's map of the design for the plantings below.)



Ben W. Hess

DNP assistant director Tom Swinford said, "The Limberlost is one of my very favorite projects statewide. The Division of Nature Preserves and Friends of the Limberlost have worked together since day one, shoulder to shoulder, bringing this vast former wetland back to life. The 1,700 acres of poorly yielding farm ground have been returned to a mosaic of prairies, marshes, swamp forests and oak woodlands, creating hundreds of acres of native plant and wildlife habitat. It's become a real destination for birds. Also, fascinating cultural sites, including a Civil War era cemetery, are being protected in the project area."

Anyone interested in volunteering with Friends of the Limberlost can contact Nicky Ball at *nball@indianamuseum.org* or Ben W. Hess at *bhess@dnr.in.gov*.

Terri Gorney is vice-president of Friends of the Limberlost and a DNR volunteer.

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Hiking Yellow Birch Ravine

Samantha Ransdell

By Eden, Samantha and Taylor Ransdell

Crawford County's Yellow Birch Ravine has been on our family's to-do list since we learned of it at the INPAWS conference in 2016. Fearful of getting lost in a nature preserve with no trails and few signs, we were thrilled to hear of a guided hike led by INPAWS president Mike Homoya and DNR regional ecologist Ryan Keller. Including our leaders, nine native plant enthusiasts met at Patoka Elementary School in Taswell on June 3, a muggy Saturday morning. We carpooled to an inconspicuous parking space, where a shallow stream winding through the preserve led our group directly into the ravine.

Near the water's edge, a massive green dragon (*Arisaema dracontium)* greeted us with its unique flower. As the sandstone bluffs rose up on either side, we began seeing other evidence of what makes this area so unique. Many species of ferns littered the forest floor, including silvery glade fern (*Deparia acrostichoides*) and rock polypody (*Polypodium virginianum*). Where the topsoil had washed away from rain and flooding, thousands of yellow squirrel corn bulblets (*Dicentra canadensis*) dotted the ravine bottom.

The air in the ravine was even steamier than outside the woods. Due to a warm winter, many of the expected flowering species had already come and gone, with the notable exception of zigzag spiderwort (*Tradescantia subaspera*) and maple-leaf waterleaf (*Hydrophyllum canadense*). We were still able to find lingering blooms on some mountain laurel (*Kalmia latifolia*), as well as vigorously flowering wild hydrangea (*Hydrangea arborescens*). Clinging to the steep ravine walls we found cinnamon fern (*Osmundastrum cinnamomeum*) with its tall fertile frond.

After weaving back and forth across the creek for about half a mile, we came upon a true botanical highlight. Nestled on a high

Hiking – continued on page 18

Volume 24, Number 4

inpaws journal

Indiana Native Plant and Wildflower Society Winter 2017-18

Host plant spotlight

Colorful spicebush supports many species

By Jordan Marshall

Throughout Indiana's hardwood forests, spicebush (*Lindera benzoin*) is an important shrub-layer species. Habitat for spicebush is broad in moisture (dry to wet) and light (deep shade to sun), which allows this species to be successful in variable forest types across the state (mesic beech-maple to more xeric oak-hickory). However, optimal growth for spicebush occurs in mesic, shady forests.

Lynne Tweedie

Spicebush swallowtail freshly emerged from its pupa (chrysalis)

Spicebush is aesthetically pleasing with its aromatic leaves, stems and fruits which produce a sweet, spicy fragrance. The species is also colorful, producing yellow flowers in spring, red berries and golden foliage in fall.

Spicebush serves as a larval host for two common lepidopterans: spicebush swallowtail (*Papilio troilus*) and spicebush silkmoth, also called promethea silkmoth (*Callosamia promethea*).

Spicebush swallowtail uses both spicebush and sassafras (*Sassafras albidum*) as larval hosts. Females lay green-white eggs singly on the undersides of young leaves. Once larvae hatch, they feed from the edges inward near the leaf tip, spinning a silk mat on which they rest and folding the leaf over them. Developing through five instars, larvae continue to feed at night; they produce silk mats during later instars, curling leaves into shelter during the day. Mature spicebush swallowtail larvae produce silk girdles attached to slender branches and pupate. Prior to pupation, larvae often leave the host plant. Early season pupae will develop into adults in about 10 days, while late season pupae will overwinter and develop into adults in the spring. Adults live about 14 days and feed on nectar. The list of larval host plants is relatively short; however, the list of adult nectar plants is extensive. Spicebush swallowtails produce three broods a year in the southern portions of their range, two broods in the northern portions.

Spicebush silkmoth has larval host preferences similar to spicebush swallowtail. Additional larval hosts include white ash (*Fraxinus americana*) and black cherry (*Prunus serotina*). Unlike spicebush swallowtail, spicebush silkmoth females lay clusters (4-10) of flat white eggs on the upper sides of leaves. Larvae feed together in early instars,

Spicebush – *continued on page 3*

Inside

Conference educates and entertains

Michael Huft

By Patricia Happel Cornwell

A crowd of 315 native plant fanciers gathered Oct. 28 at Bloomington's Monroe Convention Center for the annual INPAWS conference with the theme of "Aldo and Friends: Phenology, Biology and Saving the World."

Thanks, sponsors!

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In welcoming conferees, president Mike Homoya noted that 2018 will be INPAWS' 25th anniversary. The organization started in 1993 with 150 members and currently has almost 900 dues-paying members and 10,000 participants in its Facebook group.

Election of board members tapped Ellen Jacquart as new vice-president, Paul Rothrock as a new at-large director, Greg Shaner to continue as secretary and Don Gorney to continue as treasurer. They will serve two-year terms beginning in 2018.

Dr. Stanley Temple, senior fellow with the Aldo Leopold Foundation and Beers-Bascom Professor Emeritus at the University of Wisconsin-Madison, spoke on the value of Leopold's decades of records of plants' bloom dates, birds' migration and other changes in the natural world. Temple showed that some co-evolved species such as birds, insects and plants can "get out of sync if they respond differently to climate change."

David Gorden, ASLA, a landscape architect with Mark M. Holeman, Inc., in Indianapolis, presented gardeners in the audience numerous options for incorporating native plants into structured home landscapes that will not cause neighbors to complain about "weeds." He encouraged listeners to "show human intervention" by massing sweeps of a single species of flower, trimming shrubs, mowing, using borders, fences or other "hardscape" elements.

Dawn Slack, Southern Indiana land steward with The Nature Conservancy (TNC), gave an update on the Indiana Invasive Species Council's multi-media campaign. Their updated web site is *indianainvasivespecies.org*. The group, which has introduced a new draft of the state's terrestrial plant rule for consideration by the Natural Resources Commission, will have a conference Feb. 15 at the Hendricks County 4-H Center in Danville.

Mike Homoya led an entertaining and informative trivia game in which tables of participants vied to get the most correct answers about "natural Indiana." The multiple-choice exercise tested their knowledge of the state's native plants, animals, history and geography.

Douglas Ladd, a conservation biologist with TNC in Missouri, discussed the impact of humans on the ecosystems of the earth and the need for individuals to document the environmental changes they observe. "It's amateur citizen scientists who are going to preserve individual species. Be a good naturalist," he urged. "Document what you see, share it. It's critical that you do this, because nobody is going to do it for us."

Cheryl Coon, forest botanist for Hoosier National Forest (HNF), spoke on methods used to protect and manage the forest's 24 "Special Areas," so designated for their geologic, archeologic or biologic significance. Together, they contain 89% of Indiana's endangered species. Since 2015, HNF and DNR personnel have been cooperating to monitor rare plant populations and remove invasive species from these areas.

Patricia Happel Cornwell is co-editor of INPAWS Journal *and a member of South Central Chapter.*

Spicebush – *from page 1*

but separately in later instars. After progressing through five instars, larvae secure a leaf to a branch with silk, then spin a cocoon inside the leaf, curling the leaf around them in the process. They overwinter as pupae. Adults emerge in late spring and do not feed, producing one brood per year.

Both species use mimicry to avoid predation. For spicebush swallowtails, the important mimicry occurs as larvae. Early instar larvae for these resemble bird droppings. Later instars have eyespots (color patterns resembling eyes) that make the larvae appear snake-like, which discourages birds from feeding on them. Spicebush silkmoth does not use mimicry as larvae; however, its pupal cocoons protect larvae from predation. Spicebush swallowtail larvae also possess osmeterium—smelly, fleshy tubercules that can be extruded out from behind the head if they are disturbed. The osmeterium deter some predators, including ants.

As adults, both use Batesian mimicry, named after naturalist Henry Walter Bates, where a harmless species mimics the appearance of a harmful species. Spicebush swallowtail adults, both male and female, mimic color patterns of pipevine swallowtail (*Battus philenor*), which is bitter-tasting and potentially poisonous to predators. Spicebush silkmoth also mimics pipevine swallowtail, but only in males, while female color patterns are more camouflage and cryptic.

Besides its importance to these insect larvae, spicebush is a key food source for wildlife species, including several small to medium mammals and numerous bird species, especially wood thrush (*Hylocichla mustelina*). Spicebush berries are a high-quality fall food source for songbirds, with a relatively high crude fat content, which is important for migration or overwintering in place. Due to its low to medium palatability to white-tailed deer (*Odocoileus virginianus*), spicebush flourishes in forests under heavy herbivory. Additionally, eastern tiger swallowtail (*Papilio glaucus*) larvae can develop successfully on spicebush.

Lynne Tweedie


Wikimedia


Lynne Tweedie

Spicebush swallowtail, spicebush blossoms and spicebush swallowtail larva

As with any native plant, there are co-evolved relationships with animals, and spicebush is no exception. While spicebush individual plants do not necessarily benefit from the larval feeding of spicebush swallowtail or spicebush silkmoth, the herbivory does not result in major harm or stress to the plants. Songbird feeding on fruits is key to survival of the birds and the dispersal of spicebush seeds. Planting spicebush, along with other native plants, provides necessary habitat and food for numerous animal species.

Jordan Marshall is associate professor of biology at Indiana University-Purdue University Fort Wayne.

Thanks, conference team!

Tom Hohman, chair
Jeff & Sandy Belth
Mary Damm
Wendy Ford
David Gorden
Don Gorney
Mike Homoya
Michael Huft
Ellen Jacquart
Bill McKnight
Fritz Nerding
Paul Rothrock
Mark Sheehan
Suzanne Stevens
Carolyn Wamsley

Preliminary results in for

By Donald Ruch

A 24-hour bioblitz was held June 10-11, 2017, sponsored by Red-Tail Land Conservancy (RTC) and Indiana Academy of Science (IAS), on two properties owned or maintained by RTC: White River Woods (WRW) in Delaware County and McVey Memorial Forest (MMF) in Randolph County.

Iris pseudacorus, *pale yellow iris (Paul Rothrock)*

The term "BioBlitz" (also written "bioblitz") was coined by Susan Rudy, a US National Park Service naturalist, while helping to organize the first BioBlitz at Kenilworth Aquatic Gardens, Washington, DC, in 1996 (Ruch et al, 2010; Post, 2003). A bioblitz, short for biodiversity blitz, is a rapid assessment of the flora and fauna living in a particular area at a given point in time (Field Museum, 2007). It is essentially a "snapshot in time" of the living organisms of a particular site. A full bioblitz must take place over a 24-hour period since different organisms will be found at different times of day or night. It should be noted that since the species pool changes throughout the year, a one-day bioblitz does not produce a complete inventory of the biodiversity of a site.

Southeast of Muncie and just north of Prairie Creek Reservoir, WRW is a 117-acre nature preserve adjacent to the White River. It is composed of a large riparian woodland, an upland forest and several old fields in various stages of succession. MMF, a 249-acre preserve, lies on State Rd. 1 approximately seven miles north of Farmland. Edna McVey established this nature park in her will so future generations could enjoy it. MMF is a wonderful example of upland forest, river bottom woodland, prairie and wetlands. Bush Creek meanders through the woods to the Mississinewa River which borders the property on the north.

The event attracted over 70 scientists, naturalists and volunteers working in 18 teams focusing on ants, aquatic macroinvertebrates, bats, bees, beetles, birds, butterflies, fish and snails, herpetofauna, moths, mushroom and other fungi, non-vascular plants, odonates (dragonflies and damselflies), singing insects and other insects, snail-killing flies, spiders, small mammals and vascular plants. An archaeology/geoarchaeology group also participated.

Preliminary results from the bioblitz have recorded to date a total of 1,028 taxa. Results are presented here in this order: taxonomic group, total number of species/taxa found, number at WRW and number at MMF. Since a species/taxon can occur at both sites, the total number of taxa/species at WRW and MMF can exceed the total number reported.

The results to date include ants (15 species, nine at WRW, 11 at MMF), aquatic macroinvertebrates (90 taxa, 67 at WRW, 77 at MMF), bats (eight species, three at WRW, eight MMF), beetles (60 species from MMF), birds (78 species, 59 at WRW, 66 at MMF), butterflies (25 species, 19 at WRW, 15 at MMF; Fig. 3), herpetofauna (12 species comprised of five amphibian species and seven reptile species; five at WRW, 11 at MMF),

Rhodotus palmatus, *netted rhodotus or wrinkled peach (Steve Russell)*

Limenitis arthemis, *red-spotted purple butterfly (Paul McMurray)*

Enallagma exsulans, *stream bluet damselfly (McMurray)*

Gomphus crassus, *Handsome clubtail dragonfly (McMurray)*

Red-Tail Conservancy bioblitz

moths (51 taxa all at MMF, no sampling at WRW), mushrooms (51 species, not separated by site; Fig. 2), non-vascular plants [mosses] (29 species, 22 at WRW, 24 at MMF), odonates (28 species comprised of 18 dragonflies and 10 damselflies; 20 at WRW, 20 at MMF; Figs. 4 & 5), singing and other insects (11 species, four singing insects, seven other insects, not separated by site), snail killing flies (11 species all from MMF; Fig. 6), spiders (81 species including six new state records, 27 at WRW, 64 at MMF); and vascular plants (478 taxa, 289 at WRW, 406 at MMF).

Reports from the bee, beetle, fish and mussel, and small mammal teams have not been submitted yet.

A complete analysis of the flora of both sites has not yet been completed. However, the plants occurring at the sites were typical for the various habitats found in east central Indiana. Some examples of plants occurring at WRW were climbing wild rose (*Rosa setigera*) (Fig. 7), common hoptree (*Ptelea trifoliata*) (Fig. 8), waxy-leaved meadow-rue (*Thalictrum revolutum*) (Fig. 9), pale yellow iris (*Iris pseudacorus*) (Fig. 1), cow parsnip (*Heracleum maximum*), early wildrye (*Elymus macgregorii*) (Fig. 10), and purple-stemmed angelica (*Angelica atropurpurea*). There were no state endangered, threatened or rare species found at either site.

Approximately 25% of the species were non-native (69 of 289 taxa at WRW, 104 of 406 taxa at MMF). The majority of the non-natives occurred in more disturbed sites, such as roadsides, old fields and woodland edges, especially the edges adjacent to agriculture. One interesting find at MMF was a small planted prairie along State Rd. 1 with nearly two dozen compass-plants (*Silphium laciniatum*) and many showy goldenrods (*Solidago speciosa*). Overall, parts of WRW and most of MMF are of nature preserve quality and contain some noteworthy remnants of the natural quality of east-central Indiana.

As overall coordinator of the 2017 bioblitz, I would like to express my sincere appreciation to the RTC staff, particularly Barry Banks, executive director, and Micayla Jones, stewardship director, as well as all who participated to make the bioblitz an enormous success. Through the generous support of RTC, IAS and the Robert Cooper Audubon Society, participants were provided overnight lodging, lunch and dinner on Saturday and water and snacks both days. Everyone enjoyed the camaraderie, seeing new nature preserves and describing their biodiversity.

Although the dates have not yet been set for the 2018 IAS-sponsored bioblitz, it will be held at Eagle Creek in Indianapolis. As plant enthusiasts and experts, you are encouraged to join the fun and to contribute to our understanding of the biodiversity of Indiana. If interested, please contact me at *druch@bsu.edu*.

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The Field Museum. 2007. Calumet Bioblitz. At http://www.fieldmuseum.org/bioblitz

Donald Ruch is professor of biology at Ball State University and a member of INPAWS East Central Chapter.

Elymus macgregorii, *early wildrye (Rothrock)*

Thalictrum revolutum, *waxy-leaved meadow-rue (Hess)*

Limnia boscii, *a snail-killing fly (Steve Marshall)*

Rosa setigera, *climbing wild rose (Ben R. Hess)*

Ptelea trifoliata, *common hoptree (Hess)*

How does pollination work?

Botany basics

By Adrienne Funderburg Newsome

Imagine you are a flowering plant. You wave gently in a warm breeze and are in full bloom, looking and feeling lovely. All you want is to live and help propagate your species by making seeds. There's a catch, though. You need to get your *male gametes* (sperm) over to fertilize your *female gametes* (eggs) before you can begin forming seeds. But the male and female gametes aren't produced in the same place on a flower. Sometimes they aren't even on the same flower or the same individual plant. It seems you are going to have to recruit some help in order to get your DNA where it needs to go.

Wikimedia

*Violets (*Viola *spp.) are an example of a plant that produces both out-crossing flowers (above) and cleistogamous flowers (below) on the same individual. Cleistogamous flowers, which remain closed and are often underground, seal their pollen within, ensuring self-fertilization.*

In flowering plants, the male gametes are carried by tiny pollen grains produced by the anther. The female gametes are produced in the ovules of a flower, contained within the flower in an area called the ovary. The female gametes are completely contained within the flower – there is no way for a pollen grain to reach them directly. Instead, pollen grains need to land on the stigma of a flower, which is like a tiny landing pad specialized to catch the grains. Successful arrival of a pollen grain onto the stigma is called *pollination*. Biochemical interactions on the stigma then signal the pollen grain to grow a *pollen tube* through the top of the stigma, down through the style to reach the ovary, and finally into an ovule. There, the sperm fertilizes the egg and a seed begins to develop.

Fertilization is when the male and female gametes fuse. The resulting offspring varies genetically from both parents; it has a mixture of parent genes rather than being an exact copy of one or the other. This "genetic recombination" strategy, using two organisms to create offspring, is called sexual reproduction, while asexual reproduction only requires a single organism and does not involve the fusion of sperm and egg. Sexual reproduction, performed by plants and other organisms, increases a population's genetic diversity, which helps prevent inbreeding and the negative health effects that go along with it. Genetic diversity also gives populations a greater chance of survival in case of habitat changes. Changes to the environment (such as climate change, changes in precipitation, or the introduction of invasive species) will impact a large number of individuals in a suffering population, but with a wide gene pool, there may be individuals that have genetic strengths to resist the change and may survive more successfully than their counterparts.

While great for genetic health, sexual reproduction can be energetically expensive and a bit risky. What if your pollen doesn't get where it needs to go, and no other pollen gets to you? Bees, bats, wind and other organisms and phenomena increase the odds of successful pollination between individuals. This passing of DNA between plants is called *out-crossing*. Nectar may be produced as a lure and reward, and some plants, like orchids, mimic biochemical signals of some insects in order to trick them into interacting with their flowers. Each time a pollinator maneuvers around a flower, it picks up pollen on its body and ends up depositing previous flowers' pollen. It's no wonder that pollinators are so fundamental for plant health and reproduction; they are responsible for the genetic strength and long-term survival of many plants that humans love and are incredibly dependent upon.

Instead of using pollinators, some plants *self-fertilize*; a single plant's pollen will fall onto the stigma of its own flower, which will fertilize the eggs within and develop into offspring. This is a relatively simple way to ensure that pollination and fertilization occur and that seeds are made, as pollen and stigma are in close proximity

Pollination – *continued on page 14*

Weed Patch Hill gets new look

By Leslie Bishop

If you have visited Brown County State Park (BCSP) in the past year, you may have noticed changes on Weed Patch Hill. Since the 1800s the Hill has morphed from farmland to game farm (early 1900s) to airstrip (1935) to state park (1941). For years, the Hill was maintained as a large mowed lawn and used as a playing field. But in 2014, Weed Patch Hill began its transformation into a wildflower meadow. Mowing large expanses of grass is not only a waste of energy; it also removes land from the pool of habitat resources needed by wildlife (Xerces, 2011).

An initiative sponsored by Friends of BCSP raised $12,000 in grants to fund the meadow project, including a generous $5,000 contribution from INPAWS. Other grants were received from US Fish and Wildlife Service (USFWS), REMC, Brown County Lions Club and the J.F. New Foundation. Mike Homoya, botanist with DNR's Division of Nature Preserves, approved the plant list and seed source.

In North America, insect pollinators are in trouble. There has been a great deal of publicity on the decline of managed honeybee colonies from colony collapse disorder. What is less known is that wild insect pollinators such as bumblebees also are declining. In a 2006 study, the National Research Council warned of the cumulative problems of parasites, diseases, urbanization and pesticide poisoning as threats to insect pollinators. In addition, with the increase in agricultural acreage used for single crops, floral diversity has decreased, resulting in poor nutrition for pollinators (Calderone, 2012). As human activities continue to have deleterious effects on insect populations, it is more important than ever to create natural habitats like the new BCSP wildflower meadow, with diverse native flowering plants.

Each step of the project brought new challenges. Once DNR approved the site change in December, 2013, a year-long task of site preparation began. The management protocol was that suggested by the Xerces Society for Invertebrate Conservation (Xerces, 2012), which entailed herbicide treatment to kill the grass, frequent mowing and invasive plant removal. Volunteers from Friends of BCSP and Brown County Native Woodlands Project turned out for the invasives removal day.

Planting was delayed from November, 2014, until March, 2015, due to an unusually wet season. When planting day finally arrived, an inspiring collaboration gathered at the meadow: Rex Watters from DNR Lake Monroe, with the largest tractor I have ever seen; park staff with a special no-till seed drill rented from Bartholomew County Soil and Water Conservation; Rich Geboy from USFWS, with experience in planting prairies; Doug Baird, BCSP property manager; and Jim Eagleman and me representing BCSP Nature Center.

The first summer for the new meadow was an exciting time. Even though bloom was not yet prolific, we noted good starts of an array of flowers from June to late September. Since that first summer in 2015, we have been recording species in bloom. We are seeing not only species from the original seed list but also other common species that have dispersed in naturally. As the meadow matures, these native plants are attracting a diverse assemblage of insect pollinators.

Leslie Bishop

During its first three summers, the meadow has already attracted an abundance of local pollinators.

The new meadow is intended to benefit pollinators in two ways. First, the profusion of native flowering plants throughout the summer increases the abundance of local pollinators such as bees by increasing pollen and nectar resources. Second, the meadow includes host plants for larval butterfly development, including several native sedges (*Carex* spp.), thus increasing the abundance of butterfly pollinators. In addition, the meadow has increased habitat diversity in the park and is providing nesting habitat for field birds as well as native bees.

In a visit to the meadow last October, I watched in amazement as insects visited patches of lavender mistflower (*Conoclinum coelestinum*), lacy white boneset (*Eupatorium perfoliatum)* and the last remaining New England asters (*Symphyotrichum novae-angliae)*. We had yet to have our first frost. I also watched two species of

Weed patch – *continued on page 13*

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Mission

To promote the appreciation, preservation, scientific study, and use of plants native to Indiana.

To teach people about their beauty, diversity, and importance to our environment.

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All are invited to submit photos, articles, news and event postings. Acceptance for publication is at the discretion of the editor. INPAWS welcomes differing points of view. Please submit text and high resolution photos (300 ppi) via e-mail to journal@ inpaws.org. Submission deadlines for specific issues are: Spring – Jan. 22 for April 1 mailing; Summer – April 22 for July 1 mailing; Fall – July 22 for Oct. 1 mailing; Winter – Oct. 22 for Jan. 1 mailing

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President's Message

By Mike Homoya

Greetings, fellow wild ones!

If you were at our conference in October, you might understand my greeting. On the final slide of my presentation titled "*Natural Indiana: It's Wilder Than You Think*," the text that appeared was "Born to Be Wild." Maybe those present thought it was intended for amusement, but I like to think it was celebrating wild things (and not the wild man flailing in the stinging nettles!).

It was a wild thing . . . a wild plant . . . in a wild place that turned me on to native plants and natural areas. You might remember that, in my first journal message as president, I mentioned the first time I saw native azaleas growing wild near my hometown. There they were, growing wild, practically under my nose! I was transfixed. No longer was the subject of my interest confined to captivity. Soon I learned there was more wildness within my grasp, including other amazing wildflowers, wild ferns, even wild orchids! I soon became a wild one.

My hope is that everyone will appreciate the wilder things in life. I am proposing a couple of initiatives for 2018 to get people outside and fired up about native plants. One is to develop a team of *ambassadors for native plants* and natural areas. It would involve instruction in various aspects of native wild plants, including identification, habitat, life history, uses and conservation. Graduates of the program would be awarded a certificate and shirt which prominently identify them as ambassadors. Since the mission of the ambassador is to share native plant information with the public, particularly while hiking in a favorite park or nature preserve, the shirt could proclaim in bold letters "I know native plants" or "Ask me about native plants" to initiate a conversation.

Another project is an annual *state-wide challenge to count spring wildflowers*. Besides being fun and another method of promoting our organization and native plants, it could be a great longterm citizen science project, documenting the blooming dates of our Indiana flora. It could also help build our finances. Similar efforts counting birds, known as "birdathons," have been very successful garnering monetary contributions. The more funds we have, the better we can spread the word about native plants. If you are interested in playing a role in either or both of these programs, please contact me.

Let's get wild!

Michael Huft

INPAWS President and wild one Mike Homoya (right) joked with speaker Douglas Ladd during INPAWS Conference 2017.

Save the date!

INPAWS Native

Plant Sale

Sat., May 12

Park Tudor School

Indianapolis

Clarification

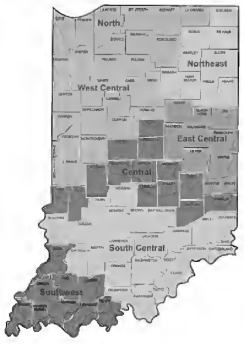
In our fall issue, the heading for the list of monarch-friendly plants on page two called them all "host plants." While only milkweeds are reproductive hosts to monarchs, the other plants are all needed as nectar sources to sustain them on their migration. Several dictionaries define "host plants" broadly as those that serve as cover, habitat, reproduction sites or food for another organism, but in strict botanical terminology, it is restricted to mean a reproduction site. In the note at the end of the related article, we said Amber Barnes is with Pollinator Project; we should have said Pollinator Partnership. For more on how you can help monarchs, go to *www.pollinator.org/MWAEBF*.

Help science in Project BudBurst

If you can't wait to get out in the woods and fields and look for the first signs of spring, here's a great project for you: Project BudBurst, a citizen science program of Chicago Botanic Garden. Similar to Cornell Lab of Ornithology's eBird reporting system, BudBurst participants report the first leaf, flower, fruit and other aspects of individual plants, as single observations or over a period of time. The collected data contribute to the understanding of the effects of climate on plant and animal life. To see how it's done, check out *budburst.org/observing-plants*.

Chapters out and about

INPAWS In Action



Central

Central Chapter members shared the summer blooms in their yards with others through well-attended, short-notice "pop-up" tours around the Indianapolis area. (See "Pop-up garden tours," opposite.)

Bobby Kimball and family staffed the INPAWS table at the McCloud HoneyBee Fest in Hendricks County in August, sharing information about native plants and bees with the crowd. Bobby made the table especially enticing to children with kid-related activities.

Third graders at Indian Creek Elementary School in Marion County planted milkweed seeds in their butterfly garden with seeds and assistance from chapter members.

Dr. Rebecca Dolan, director of Butler University's Friesner Herbarium, spoke to members about the Indiana Plant Atlas at Butler on Nov. 12.

Northeast

In August, Northeast Chapter held a members picnic at a unique private home in Noble County. Members explored the owners' prairie with more than 100 native species and learned how their alternative septic system uses native wetland plants to treat wastewater. For the field trip, the group traveled to Chain O' Lakes State Park to explore Glacial Esker Nature Preserve, home to several state-endangered plants. Hikers saw elm-leaved goldenrod (*Solidago ulmifolia*), late horse gentian (*Triosteum perfoliatum*), pickerel-weed (*Pontederia cordata*) in bloom, white lettuce (*Prenanthes alba*) and Virginia white grass (*Leersia virginica*).

Wendy Ford made the two-hour trek up north to help our chapter focus its abundant energy. We did a "SWOT" (strengths, weaknesses, opportunities, threats) analysis to come up with three goals for 2018. We decided to (1) develop a consistent message for all chapter communications, (2) increase member families to 100 and (3) pair 25% of chapter activities with a stewardship or hands-on activity that improves biodiversity.

In September, the chapter partnered with Fort Wayne City Utilities to organize a wildflower hike at Camp Scott (See "From POW camp to wetland," page 16.). This event drew not only members, but the public. Non-members learned how natural spaces benefit when invasive species are actively managed.

In October, members and their families attended the annual meeting at Gene Stratton-Porter State Historic Site. Committee chairs summarized their efforts in 2017 and discussed exciting new programs for 2018. Members voted to elected a new vice-president, Jennifer Caseldine-Brach. We also unveiled our chapter goals for 2018. Tiffany Conrad, naturalist, led the group on a tour of the site's newly restored wetland and prairie, where American water plantain (*Alisma subcordatum*), softstem bulrush (*Schoenoplectus tabernaemontani*), and partridge pea (*Chamaecrista fasciculata*) were observed.

Southwest

Southwest INPAWS (SWINPAWS) members heard a presentation by Will Drews on invasive plant identification and control at the chapter's July meeting at Wesselman Woods Nature Center in Vanderburgh County. Drews, natural resource specialist with Knox County Soil and Water Conservation District (SWCD), brought specimens from his work, including a six-inch diameter cross-section of invasive wintercreeper removed from a wood lot in Knox County.

Later in July, members hiked at Vectren Conservation Park in Gibson County, led by Dr. Cris Hochwender of University of Evansville (UE). The 1,100-acre property, surrounded on three sides by the Wabash River, had been farmed since the early 1800s. In 2001, it was purchased by Vectren Corp., an energy company, and is being restored from agricultural use to natural habitat. In 2002, Vectren planted over 136,100 trees obtained from DNR's Vallonia Nursery. The site, which includes wetland and riparian forest, is now leased by UE and managed by Hochwender.

At the group's September meeting, Andrew Smith, urban conservationist with Warrick County SWCD, updated members on his work to introduce native plants to urban landscapes in the Evansville area and to educate the public about them. Following his talk, Deb Schade and Kate Lynch shared their expertise in raising monarch and black swallowtail butterflies, respectively, with the help of caterpillars and chrysalises they brought along.

SWINPAWS held a native plant sale Oct. 14 at the Southwest Indiana Master Gardeners Display

"Pop-up" garden tours

By Amy Perry

INPAWS Central Chapter hosted 11 "pop-up" native garden tours in 2017. A pop-up is a tour of a private garden, announced on short notice. Pop-ups enable visitors to see many gardens in progress over the course of a summer. Each tour can be customized to reflect the gardener's personality and preferences. Garden styles ranged from a remnant forest to color-themed plots, controlled prairies and extensive shoreline gardens.

Public natural areas were added as self-guided tours in connection with nearby residential gardens. A pop-up tour in late September, hosted by Joe and Vicki Dwenger, highlighted native plants in the Dwenger home landscape and at Southeastway Park. Sister Angela Jarboe hosted visitors to the Peace and Nature Garden at Benedict Inn Retreat and Conference Center, Beech Grove. Two other public sites toured were in Fishers, including plantings in the Ridgefield subdivision and pond-edge planting by Weaver Creek Property Owners Association.

People attending the summer's garden tours totaled 380, including 146 non-members. Guests enjoyed:

- Seeing native plants' growth habits throughout the season, especially unusual species
- Getting to know other chapter members
- Exchanging gardening ideas
- Educating non-members about native plants and INPAWS
- Increasing botanical and horticultural knowledge (e.g., bank stabilization methods, invasive removal techniques, shade utilization, landscape design, learning new species)

Team leader Amy Perry thanks team members Barbara Goldblatt and Cathy Donnelly; tour hosts Michelle Arfman, Mary Durkin, the Dwengers, Barbara and Irv Goldblatt, Sarah Gray, Judith Houser, Sister Angela Jarboe, Harry and Cherie Kuhn, Bill McKnight, George Peregrim and Jackie Sundboom; and helpers Steve Cline, Irv Goldblatt, Linda Haas, Cindy Monnier, Paige Robbins, Amy Shelton, Suzanne Stevens, Debra Stoll and friends and family of hosts.

Amy Perry is a very active member of INPAWS Central Chapter.

Amy Perry

Nearly 400 people attended pop-up tours put on by INPAWS Central Chapter last summer.

Chapters – *from left*

Garden to provide native plant stock to the public and raise funds for the chapter. Over 900 plants of more than 100 species were sold, and public interest exceeded the inventory. Plants were contributed from members' gardens, the UE native garden and Knox County SWCD. Plans are afoot to make next year's sale even bigger.

West Central

Members of West Central Chapter's RIP (Remove Invasive Plants) Squad were hard at work from October until late December. They pulled invasives in Tippecanoe County at Prophet's Rock Park, Ross Hills Park and Ross Hills Camp. They were assisted by Purdue University students from Alpha Phi Omega service organization.

In October, the group conducted two "Pulling for Bats" events, one at Prophet's Rock, the other at Ross Hills Camp. The programs involve removing non-native invasive shrubs which negatively affect the habitat for native bats as well as birds and plants.

Dawn Slack, southern Indiana land steward with The Nature Conservancy, spoke on "The Importance of a Biodiverse World: Ecology and Invasives" at the chapter's Sept. 25 meeting. On Oct. 23 Mike Jenkins, associate professor of forest ecology in Purdue's department of forestry and natural resources, addressed members on "The Diversity in Indiana's Forests – Will it Last?" Don Ruch, professor of biology at Ball State University, spoke on "Mushrooms, Mycelia and Morels" at the Nov. 27 meeting.

Topic of the Jan. 22 meeting will be "The Lafayette Park System and You," presented by Don Staley, natural resources and recreation planner for Lafayette Parks and Recreation Dept.

The chapter will meet at Lilly Nature Center in Celery Bog Park, West Lafayette, at 7:00 p.m. on 4th Mondays in February, March and April.

SCINPAWS visits prairie

By Ellen Jacquart

Members of South Central INPAWS Chapter visited two beautiful prairie gardens last summer, both developed by women with a real passion for native plants. The path each took was different, but the results are beautiful. Paul Rothrock led both field trips, identifying the plant species that bloomed in profusion. Groups visited the Schwitzer prairie July 24, the Wood property Aug. 10.

Ellen Jacquart

(top) Phyllis Schwitzer who developed the prairie garden is front left, in purple shirt. (above) Paul Rothrock shares information on native plants with SWINPAWS members.

The Monroe County land on which Phyllis Schwitzer's prairie sits was purchased in 1971. At that time, the area was planted in soybeans and had been farmed for many years, creating erosion and loss of topsoil. After a house was built, the rest of the hilltop field was planted in fescue and other grasses and was mowed frequently. It was a rough, weedy area and, after a while, it seemed pointless to mow so many acres as if they were a lawn.

Around 1991, Phyllis heard Neil Diboll of Prairie Nursery speak at an INPAWS conference. She was inspired to create a prairie when she learned the many benefits of a prairie, from reducing erosion to attracting wildlife and butterflies to enjoying the beauty of a semi-wild area. Phyllis purchased seed for native prairie flowers and grasses and prepared the two-acre field by spraying with Roundup, tilling, then spraying and tilling again. In June 1993, she hand-planted the seed, crisscrossing the area to spread it evenly.

The field was mowed to six inches tall a few times the first year to discourage perennial weeds from competing with the seedlings. By the third year, prairie flowers were blooming, and today this prairie garden is magnificent, with a succession of blooms as the season progresses. Phyllis's ongoing maintenance includes annual brush-hog mowing, mowing of paths and occasional use of grass-specific herbicide to keep tall grasses from dominating the planting.

Myriam Wood bought the land in Owen County that became her "Fish Creek Preserve" in 1973. Like Phyllis, she was inspired by Neil Diboll at Prairie Nursery to start a prairie garden, but she took a different tack. Myriam took the "prairie pocket" approach, combining a variety of native plants into discrete garden beds. Starting in 2008, she turned the lawn around her house into mowed pathways that wind around prairie plantings of different sizes and shapes.

One pocket, for instance, has brilliant red royal catchfly (*Silene regia*) towering above shorter blue wild petunias (*Ruellia humilis*) that border the pocket. Another features purple coneflower (*Echinacea purpurea*) blooming above mistflower (*Conoclinium coelestinum*). As areas were being cleared to turn into prairie pockets, unexpected treasures popped up, like purple fringeless orchid (*Platanthera peramoena*).

Changes Myriam has made over time to make her prairie pockets more attractive to pollinators include planting blocks of native plants rather than single individuals scattered about and planting for continual blooms from early spring to late fall.

A mowed path leads down the wooded hill to the floodplain along Fish Creek. Here there are open wetlands that already had many native wet prairie species when the Woods acquired

Weed patch – from page 7

the property. Myriam enhanced the wetlands with native species like rose-mallow (*Hibiscus palustris*), prairie dock (*Silphium terebinthinaceum*), cupplant (*Silphium perfoliatum*), Culver's root (*Veronicastrum virginicum*), tall coreopsis (*Coreopsis tripteris*) and big bluestem (*Andropogon gerardii*).

Myriam has learned a lot in her years of prairie gardening. She offers these lessons:

- Start small; clear a spot through cultivation or smothering of weeds for a year or so.
- Work with the land. Observe carefully; take time to see what is already there but hidden.
- Be curious, learn from every source possible and change course when things don't work out.
- Once started, plantings take serious management. Don't 'over-plant' and don't underestimate the time it will take to manage weeds or water new areas.

Ellen Jacquart is a member of the South Central Chapter of INPAWS.

2018 Dates of Note

2/2	World Wetlands Day
2/27	Int'l Polar Bear Day
3/3	World Wildlife Day
3/9	Solar Appreciation Day
3/20	World Sparrow Day
3/21	Int'l Day of Forests
3/21	World Fish Migration Day
3/22	World Water Day
4/22	Earth Day
4/27	Arbor Day
5/12	INPAWS Plant Sale
5/12	Int'l Migratory Bird Day
5/18	Endangered Species Day
5/23	World Turtle Day
6/5	World Environment Day
6/8	World Oceans Day
7/29	Int'l Tiger Day
8/22	National Honey Bee Day
9/30	World Rivers Day
10/24	Int'l Day of Climate Action
11/15	America Recycles Day
12/5	World Soil Day

native bees and four species of butterflies sipping nectar from flowers. I even saw three monarch butterflies (*Danaus plexippus*) working their way slowly across the field from one patch of flowers to the next. It is unusual to see this much insect activity in late October, and I am pleased that the meadow was still providing resources for insects so late in the season.

The educational potential of the meadow on Weed Patch Hill is tremendous. Thousands of visitors pass through BCSP yearly. A large field of blooming native flowers is aesthetically pleasing and beckons visitors to stop and look. The most recent addition to the meadow is an educational kiosk (also paid for by grant money) on the edge of the meadow. The kiosk provides a shaded bench under a roof and has interpretive displays explaining the importance of supporting native insect pollinators, as well as the history of Weed Patch Hill. Hopefully, visitors will be inspired to plant native flowers in their own yards at home and to create their own pollinator habitats.

The next stage of the project will include a walking trail around the perimeter of the meadow. I hope to find funding that will enable us to design a wheelchair accessible trail for at least part of the meadow.

As citizens, we can encourage county, state and federal agencies to include naturalized areas planted in native flowers and grasses in their management plans. The wildflower meadow at BCSP is a good example of how management practices can adapt to current ecological needs.

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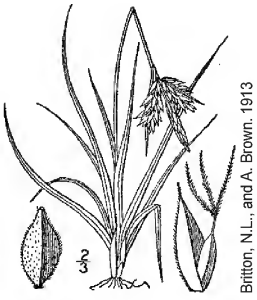
Leslie Bishop is professor emerita in biology at Earlham College, Richmond, a member of INPAWS South Central Chapter and Friends of BCSP.



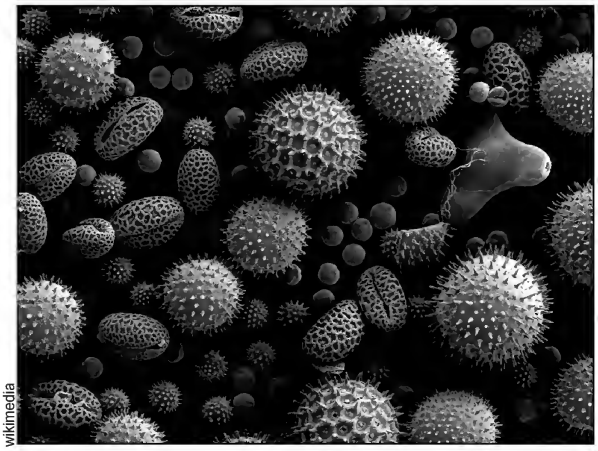
Britton, N.L., and A. Brown. 1913

*The BCSP meadow includes several native sedges (*Carex *spp.). Larvae that feed on sedges include butterflies and moths. Sedge seeds also appeal to a number of bird species.*

Pollination – from page 6

to one another. A gust of wind or jostling of the plant can cause pollen to get where it needs to go. Even more sure-fire self-fertilization occurs in cleistogamous flowers, which remain closed and are often underground. Pollen produced in these flowers stays sealed within, with only the stigma of the same flower to land on. Violets (*Viola* spp.) are an example of a plant that produces both cleistogamous and out-crossing flowers on the same individual.

Only the pollen from the same species of plant will successfully grow a pollen tube and fertilize the eggs. The pollen "knows" what plant it's on based on the biochemical signature of the stigma, which can trigger pollen tube growth. This biochemical signature is how some plants avoid self-fertilization; if the genetic profile of the pollen is *too* close to that of the flower it landed on, pollen tube growth is inhibited. Genetically varied pollen grains have the advantage in the race for fertilization in many species of plants.



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Magnified about 500 times are grains of pollen from a variety of common plants including sunflower, morning glory, hollyhock, lily, primrose and castor bean.

We've covered a pollen-grain-sized amount of information here, compared to how much more there is to know about the pollination and fertilization of flowering plants, but hopefully this introduction has equipped you to learn more about the subject and to recognize some of the remarkable processes going on in the plant kingdom.

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Adrienne Funderburg Newsome is a senior at Huntington University, where she studies biology and environmental science. Her favorite pollinator is the fruit bat.

New rules for INPAWS grants

By Daryn Fair

The INPAWS grants program started in 1995 with a $50 contribution to the Brown County Wildflower Foray. Since then, we have contributed thousands of dollars to worthy native plant projects all over the state. To streamline the program, we have developed new grant guidelines.

Starting in 2018, the application deadline for grants will be October 1. Successful grant recipients will be notified the first week of November, and funds will be provided *after* a project is completed and a report received and approved.

Applications must be in one of three categories: Research, Land Management and Restoration, or Demonstration Garden.

Research projects involve studying native plant propagation, habitat needs, life cycle and restoration, or finding more effective ways to control invasive plants. The committee will look for a clear hypothesis, feasibility of the project, number of partners or other funding sources, and outreach components.

Land Management and Restoration projects are those that focus on ecological management and restoration of natural areas. Applications must address the significance and quality of the natural area, the intended ecological benefit of the work, plans for long-term maintenance and whether there are partners or other funding sources.

Demonstration Garden projects must involve an organized volunteer group constructing a garden or gardens accessible and visible to the general public. The committee will look for a clearly described project, native plant selection, number of people who will participate in planning, installation and maintenance, who will benefit and whether there are partners or other funding sources.

For other news about grants, see "Letha's Fund sends youth far and wide" at right. Check *inpaws.org* for more about both the grant program and Letha's Youth Outdoors Fund.

Daryn Fair is chair of the INPAWS grant committee and a member of Central Chapter.

Letha's Fund sends youth far and wide

POW camp – from back cover

By Angela Sturdevant

Since its inception in 2008, Letha's Youth Outdoor Fund has awarded over $56,400 to schools and youth organizations, making it possible for almost 14,700 kids to have high quality experiences outdoors. This is an impressive legacy of Letha Bolles Queisser, "Indiana's Wildflower Lady"! (See "Letha's Story" by Cindy Monnier in the summer, 2017, *INPAWS Journal*.)

Some of the natural areas visited by youth over the years with funding from Letha's Fund include:

- Six Riverwatch stream locations in northern Monroe County
- Amigo Centre (Sturgis, MI)
- Bean Blossom Creek at Trevlac (Brown County) and Bean Blossom Bottoms (Monroe County)
- Camp Tecumseh (Brookston)
- Charlestown State Park (Clark County)
- Eagle Creek Park Earth Discovery Center & Ornithology Center (Indianapolis)
- Fernwood Nature Preserve (Buchanan, MI)
- Gene Stratton-Porter State Historic Site (Rome City)
- Greene Environmental Learning Center (South Bend)
- Holliday Park & Nature Center (Indianapolis)
- Indiana Dunes West Beach Succession Trail
- Marian University Ecolab (Indianapolis)
- Mary Gray Bird Sanctuary (Connersville)
- McCormick's Creek State Park (Spencer)
- Merry Lea Environmental Learning Center (Noble County)
- Oxbow County Park (Elkhart)
- Red Mill County Park (La Porte)
- Shakamak State Park (Jasonville)
- Southeastway Park (Indianapolis)

We have also awarded grants for creation of educational greenspaces and native plant projects at schools. These projects now fall under the reorganized INPAWS grants program (at left). Letha's Fund will continue to focus on educational field trips, funding for transportation, fees and supplies.

Grant applications are accepted on a rolling basis, and so are your donations. Information is at *www.inpaws.org/education/letha*. A check, payable to INPAWS with "Letha's Fund" on the memo line, may be mailed to INPAWS, P.O. Box 501528, Indianapolis, IN 46250.

Angela Sturdevant is chair of the Letha's Outdoor Fund committee and a member of South Central Chapter.

"From the outside, you don't see there's a wetland because of the fence and embankments. It's virtually hidden," Sanders says. "It's unusual that the wetland is higher than the point it serves, so the whole property is a bit surreal."

Property managers simulated natural conditions as much as possible. Upland plants were seeded in drier areas, wetland plants in shallow areas. Trees that died when areas were flooded were left as bat habitat. A three-quarter-mile path encircles the property and a large pier stretches into the final pond. Workers actively manage invasive species such as autumn olive (*Elaeagnus umbellata*), as well as nuisance wildlife.

"We have a bit of a groundhog problem," Slaton notes. "They dig holes in our berms, so we have to manage them, too."

Four common warm season grasses are present at Camp Scott, along with buttonbush (*Cephalanthus occidentalis*), hardstem (*Schoenoplectus acutus*) and green (*Scirpus atrovirens*) bulrush, and rose-mallow (*Hibiscus moscheutos*). At the open house, hikers also enjoyed blooming New England aster (*Symphyotrichum novae-angliae*), grass-leaved goldenrod (*Euthamia graminifolia*) and American bugleweed (*Lycopus americanus*).

As a result of all this work, Camp Scott functions like a real wetland, complete with nesting green herons, migrating birds and other wildlife. City-conducted tests show an improvement in the quality of the water leaving the wetland. The wetlands help reduce bacteria in the water and settle suspended solids.

"We talk so much about improving water quality," Sanders says. "For the City to understand that a wetland could help clean the water before it goes into the Maumee River, and then construct a unique solution, is pretty progressive. It's an elegant solution to a common problem."

Camp Scott is closed to the public, except on limited occasions and for private tours. A classroom curriculum is available for school groups and field activities. Interested persons can call 260-427-8311 for information.

Kim Miser is communications chair of INPAWS Northeast Chapter.

Seed Swap

Hamilton County Master Gardeners Association will host the Central Indiana Seed Swap Saturday, Jan. 27, 2018, 9 a.m. - 2 p.m., at Hamilton County Fairgrounds, Noblesville.

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Camp Scott: From POW camp to wetland

By Kim Miser

At first glance, Camp Scott seems an unlikely place to find wildflower enthusiasts. In the heart of Fort Wayne's industrial sector, it's a mystery property, closed to the public and encircled by a chain link fence. But for a few hours in September, Camp Scott opened its gates, allowing the public rare access. What's going on behind the fence is simply remarkable.

Kate Sanders

Camp Scott once served as an army training center and, during World War II, as a German prisoner of war camp. The property eventually was abandoned and for decades was an unofficial dump. Today Camp Scott serves a new, surprising purpose — as a constructed wetland.

The catalyst for transforming Camp Scott into a wetland arose because city leaders were trying to solve a problem. Mary Jane Slaton, program manager for Fort Wayne City Utilities (FWCU), says older sections of Fort Wayne, like the neighborhoods in the Camp Scott area, have combined sewer pipes.

"During heavy rains, combined sanitary sewage and storm water overflowed into the rivers," Slaton says. "For older neighborhoods, combined sewers could mean sewer backups."

In the 1990s city leaders devised an unusual relief plan that included a constructed wetland. City workers hauled tons of garbage from the Camp Scott site, filling more than 60 dump trucks with junk. New storm sewers were installed in several neighborhoods, a huge underground storage tank was placed under a nearby park, and Camp Scott was seeded with native plants.

The massive tank collects runoff from storm sewers. From there, the water is pumped to the property where it flows through a man-made "influent structure" that looks like a natural waterfall. The water then moves through a series of constructed wetlands just as it would in nature, using overland flow, gravity and ground water.

"The system solves two problems," Slaton says. "It not only relieves combined sewer overflows and sewer backups, but improves water quality before finally discharging into the Maumee River."

In September, Camp Scott held an open house for curious residents. Partnering with FWCU, INPAWS Northeast Chapter organized a wildflower hike led by Kate Sanders.

POW camp – continued on page 15